

## **Historic, Archive Document**

Do not assume content reflects current scientific knowledge, policies, or practices.









AD-33 Bookplate  
(1-63)

**NATIONAL**

**A  
G  
R  
I  
C  
U  
L  
T  
U  
R  
A  
L**



**LIBRARY** RESERVE  
100139 A464.07  
P693  
1954



Reserve

A464.07

P693

1954















UNITED STATES DEPARTMENT OF AGRICULTURE

Forest Service

Region One

BR  
REPORTS  
Annual - 1954

U. S. DEPT. OF AGRICULTURE  
NATIONAL AGRICULTURAL LIBRARY

AUG 10 1967

CURRENT SERIAL RECORDS

WHITE PINE BLISTER RUST CONTROL

Calendar Year 1954





3250  
and 10742

CONTENTS

WHITE PINE BLISTER RUST CONTROL - 1954

Forest Service

Region One

1. Region One
2. Clearwater National Forest and Clearwater Timber Protective Assn.
3. St. Joe National Forest and Potlatch Timber Protective Assn.
4. Kaniksu National Forest and Priest Lake Timber Protective Assn.
5. Coeur d'Alene National Forest
6. Kootenai National Forest
7. The National Park Program
8. Development and Improvement - Chemical Methods - Ribes Ecology Studies
9. Development and Improvement - Rust Resistant White Pine



UNITED STATES DEPARTMENT OF AGRICULTURE

Forest Service

Region One

BR  
REPORTS  
Annual - 1954

WHITE PINE BLISTER RUST CONTROL

Calendar Year 1954

Prepared by: H. E. Swanson  
F. O. Walters



1871

1872

1873

1874

1875

1876

## WHITE PINE BLISTER RUST CONTROL, REGION ONE, 1954

Introduction

In the reorganization of the Department of Agriculture, all responsibilities in connection with the white pine blister rust control program, formerly held by the Bureau of Entomology and Plant Quarantine, were transferred to the U. S. Forest Service. These responsibilities in Region One included the leadership, technical direction and over-all coordination of the program on all white pine lands in cooperation with the National Park Service and State and private agencies, and the direction and administration of the program on State and private lands in Idaho in cooperation with the State and the North Idaho Timber Protective Associations.

The reorganization was started January 3, 1954, by the transfer of BEPQ personnel, funds, and equipment to the Forest Service. The principal phase of the reorganization involved the closing of the Northwestern Project office and warehouse in Spokane, Washington, and the transfer and integration of employees into the Forest Service organization. The work was given division status with the project leader and his assistant headquartered in Missoula, Montana, starting July 6. The area leaders and their assistants were transferred to the national forests, where their work was formerly located, on May 23. The area leader and his assistant for the BRC program on National Parks were retained on this assignment and transferred to Missoula on July 6. Responsibilities for technical direction of BRC work on Mount Rainier was transferred to Region Six. The three employees in Development and Improvement work remained in Spokane where office space was provided in the space occupied by the Inland Empire Research Center of the Intermountain Forest and Range Experiment Station. On June 30 the Spokane Blister Rust Control Office was closed after 32 years of operation.

Where the transfer of employees resulted in duplication of BRC positions on a forest, Forest Service employees were transferred to other positions. Except for the employees who did not wish to leave Spokane or chose retirement, every employee was placed in the Forest Service.

The reorganization was accomplished smoothly and without disruption to field work. Many economies were achieved by the elimination of positions, fuller use of project equipment in more than one program and a closer integration of blister rust control with timber management practices in the white pine type.

## Problem and Objective

No significant changes occurred in the problem and the objectives in controlling white pine blister rust in Region One. The present control area constitutes:

<u>Ownership</u>	<u>Acres</u>
National Forest	878,170
Public Domain	10,000
National Parks	24,340
State	86,120
Private	<u>182,670</u>
Total	1,181,300

Except for the National Parks acreage, the control area is located in the commercial white pine type of the Inland Empire and largely in the State of Idaho. The Inland Empire work is administered under two programs; one, on national forests; the other, a cooperative program on State and private lands in Idaho. There are not sufficient State and private lands warranting cost of BRC in the States of Montana and Washington to constitute a separate field program. The control areas in the national forest and cooperative State and private programs are made up of white pine units according to the predominating class of ownership. The amount of funds available for the work is a limiting factor on the size of each program.

<u>Program</u>	<u>Acres</u>
National Forest Units	962,200
State and Private Units	<u>194,250</u>
Total	1,156,450

## Values

The potential white pine yield to be protected on the commercial white pine control area of the Inland Empire is estimated at 23 billion board feet, with approximately 19 billion board feet on National Forest Units and four billion board feet on State and Private Units.

## Cooperators

The Forest Service in providing leadership, technical direction and overall coordination of the program is cooperating directly in the field BRC programs of the

National Park Service  
State of Idaho  
Clearwater Timber Protective Association  
Potlatch Timber Protective Association  
Priest Lake Timber Protective Association



Agencies cooperating with the Development and Improvement Project in blister rust control are:

University of Idaho, College of Forestry  
 Montana State University, School of Forestry  
 University of Wisconsin, Department of Plant Pathology  
 Inland Empire Research Center, Intermountain Forest and Range Experiment Station

### Finances

Reductions in appropriations for Fiscal Year 1955 further handicapped an already underfinanced program. A 50 percent reduction in federal assistance on the State and private program was particularly severe. Unless this assistance is restored or the difference is made up from State and private sources, considerable reduction in this program will be necessary resulting in serious loss in past BRC investments in very high priority white pine land.

### BRC EXPENDITURES, REGION ONE, CALENDAR YEAR 1954

State	U. S. Forest Service					Nat'l State & Park Private All Funds		
	712	042	432	KV	Total	Service Funds	Total	
	\$	\$	\$	\$	\$	\$	\$	\$
Idaho	82,220	719,780	72,520	45,408	919,928	-	77,828	997,756
Mont.	14,167	105,042	-	-	119,209	20,818	-	140,027
Wn.	9,388	107,404	-	1,288	118,080	-	-	118,080
Colo.	2,223	-	-	-	2,223	9,566	-	11,789
Wyo.	4,947	-	-	-	4,947	34,691	-	39,638
Totals	112,945	932,226	72,520	46,696	1,164,387	65,075	77,828	1,307,290

712 - Leadership function for all programs

042 - National forest program

432 - Federal funds for State and private program

KV - Stand improvement collections used for BRC on national forest lands

### Field Program, 1954

The field organization was somewhat smaller than in previous years in number of camps and seasonal employees. The accomplishment in ribes eradication for 1954 was approximately six percent greater on a per man-day basis than in 1953, yet as a result of reduction in funds 5,600 acres less were covered in 1954. Improvement in methods and no interruptions for fire duty contributed to the greater output per man day.

# ORGANIZATION - 1954

Program	Camps	Employees	Contractors
National Forest	29	906	33
State and Private	6	221	8
National Parks	5	68	-
Totals	40	1,195	41

## PROGRESS - ALL RIBES ERADICATION - 1954

Program	Initial	Rework	Total	Man	Ribes	Per Acre	
	Work		Worked			Man	Ribes
	Acres	Acres	Acres	Days		Days	
National Forest	4,080	34,080	38,160	31,610	1,857,500	.83	49
State and Private	990	6,080	7,070	7,100	920,500	1.00	130
National Parks	840	3,160	4,000	3,030	671,500	.76	168
Totals	5,910	43,320	49,230	41,740	3,449,500	.85	69

## CHEMICAL ERADICATION - 1954

Program	Acres	Man Days	Ribes	Gallons
National Forest	2,225	4,063	1,012,350	484,050
State and Private	684	841	765,600	95,500
National Parks	400	830	535,000	21,170
Totals	3,309	5,734	2,312,950	600,720

## CONTRACT RIBES ERADICATION - 1954

Program	Number of	Acres	Man	Ribes	Amount
	Contracts		Days		Paid
National Forest	52	3,160	2,244	50,270	\$45,937
State and Private	5	252	256	2,180	3,524
Totals	57	3,412	2,500	52,450	\$49,461



# RIBES ERADICATION PROGRESS - 1922-1954

(Present Control Areas - Net Acres)

Ownership	Total Acres	Initial Work Acres	Rework Acres	Unworked Acres	Maintenance Acres
National Forest	878,170	608,960	402,880	269,210	258,050
National Parks	24,340	23,060	20,970	1,280	16,950
Public Domain	10,000	10,000	10,000	-	4,520
State and Private	268,790	201,150	179,300	67,640	87,700
Totals	1,181,300	843,170	613,150	338,130	367,220

## Changes in Operations and Trends

Financing. While reductions in federal assistance for work in State and private lands have been too great for the State and private interest to fill the gap, the Idaho Department of Forestry plans to make a strong effort to hold this cooperative blister rust program at its present level, representing approximately 195,000 acres.

Chemical Methods of Ribes Eradication. Chemical spray formulations have been developed to permit late season treatment of ribes after defoliation has occurred. An aqueous solution of 2,4,5-T (2,000 ppm), combined with five gallons of stove oil per 100 gallons of water, in which full dispersion of the oil is secured by an injector is satisfactorily destroying ribes. Deterioration of roads to many areas in the fall, together with the loss of seasonal labor early in September, has limited last season spraying.

Twenty pounds of Chloro IPC per acre can be combined with an aqueous solution of 2,4,5-T for effectively killing ribes and grass in preparing suitable planting conditions on burned areas.

Ribes Ecology Studies. A ribes seedling problem rarely develops on areas at the time of final cutting where the first cutting removes 60 percent or more of the total board foot volume and the residual stand is not cut before the tenth year.

Rust Resistant White Pine. The results of the first controlled pollinations in 1950 among rust resistant white pine selections in Region One are encouraging. The 7,400 seedlings (now in their third growing season) produced from these pollinations represent 74 different progenies. The seedlings were artificially exposed to blister rust in 1953 and outplanted in 1954.

At least four of the 20 parents represented in these F<sub>1</sub> progenies rather consistently appeared to transmit resistance as measured by the absence or lower average number of needle spots appearing on the seedlings. It



also appears that when two of these four parents had been crossed that resistance was increased. Five progenies in which one or two of these particular parents were involved showed from 20 percent to 53 percent of the seedlings being free of needle spots.

Since the nature of resistance to blister rust is not known, time and future inspections will be necessary to determine the significance of needle spots in causing damaging blister rust cankers. It is possible that resistance may be encountered by the blister rust mycelium in growing down the needle and entering the bark of the tree.

A total of 242 crosses employing 50 of the 72 rust resistant selections as parents are represented in the controlled pollinations made in the years 1950 through 1953. Some of the crosses are the same as the progenies already inoculated and outplanted. These will aid in the selection of the most promising parent trees and in the elimination of parent trees consistently exhibiting a low power to transmit resistance. The results now being obtained will be very useful in channelling future breeding work.

Spread of the Rust. Scouting for the rust in 1954 in Eastern Montana, Wyoming, Northern Colorado, Northeastern Utah, and Southeastern Idaho showed no significant change in the known spread of blister rust. In the outer perimeters of known spread, considerable intensification of the rust was found.

## Recommendations

Local Influences on Rust Spread and Intensification. For several years, this region has been recommending investigations which will lead to sound determinations in establishing protection zones in control areas and to sound decisions on the feasibility of accomplishing protection from blister rust. This may require studies in fields not altogether familiar to the pathologist, particularly in microclimate and other meteorological influences.

Continuation of Other D&I Work. Continual effort should be exerted to discover more effective chemicals for destroying ribes. The testing of fungicides which may be effective in killing blister rust cankers in white pine should be continued. Studies in ribes and white pine ecology should be pressed forward to provide information on a greater diversification of field conditions.

Permanent plots should be established in mature white pine stands to study the rate of blister rust damage in large trees.

Developments in the rust resistant white pine project foretells a possible early need to expand breeding work and to plan a program for the propagation of rust resistant white pine planting stock.

## Control Area Summary

The following summary presents the status of work on the present control area in the Inland Empire:

Status	National Forest Units (Acres)	State & Private Units (Acres)	All Units (Acres)
OWNERSHIP			
Federal	859,932	27,880	887,812
State	21,400	64,720	86,120
Private	80,868	101,650	182,518
Total	962,200	194,250	1,156,450

### CONTROL STATUS

#### Immature Stands:

Unworked	134,341	39,710	174,051
Needing rework	109,944	37,360	147,304
Needing post check	117,730	46,950	164,680
On maintenance	237,680	66,230	303,910

Subtotal	599,695	190,250	789,945
----------	---------	---------	---------

#### Mature Stands:

Unworked	178,090	-	178,090
Deferred rework	146,982	4,000	150,982
On maintenance	37,433	-	37,433

Subtotal	362,505	4,000	366,505
----------	---------	-------	---------

Total All Stands	962,200	194,250	1,156,450
------------------	---------	---------	-----------

# THE NATIONAL FOREST PROGRAM

## Expenditures - Calendar Year 1954

Forest	712 Funds	042 Funds	KV Funds	Totals
Clearwater*	\$ 8,422	\$ 83,825	\$ 4,903	\$ 97,150
Coeur d'Alene	6,176	130,211	37,501	173,888
Kaniksu*	14,448	318,134	4,292	336,874
Kootenai	3,025	54,659	-	57,684
St. Joe*	10,787	321,196	-	331,983
Totals	\$42,858	\$908,025	\$46,696	\$997,579

\*Also had cooperative program on State and private lands.

## Organization - 1954

Forest	Camps	Employees	Contractors
Clearwater	3	91	4
Coeur d'Alene	6	155	8
Kaniksu	9	325	16
Kootenai	3	45	-
St. Joe	8	290	5
Totals	29	906	33

## Ribes Eradication Progress - 1954

Forest	Initial	Rework	Total	Man Days	Ribes	Per Acre	
	Work Acres		Worked Acres			Man Days	Ribes
Clearwater	-	2,290	2,290	2,750	279,800	1.20	122
Coeur d'Alene	950	3,750	4,700	5,350	232,700	1.14	50
Kaniksu	2,350	12,170	14,520	10,790	863,000	.74	59
Kootenai	40	1,700	1,740	1,270	41,000	.72	24
St. Joe	740	14,170	14,910	11,450	441,000	.77	30
Totals	4,080	34,080	38,160	31,610	1,857,500	.83	49



Control Status on National Forest Units  
(Acres)

Forest	Immature Stands				Mature Stands				Totals	
	Unworked	Needing Rework	Needing Post Check	On Main-tenance	Total Area	Unworked	Deferred Rework	On Main-tenance	Total Area	All Stands
Clearwater	9,150	16,890	14,510	13,260	53,810	97,930	46,180	16,410	160,520	214,330
Coeur d'Alene	30,061	30,846	16,768	31,644	109,319	65,629	93,100	12,562	171,291	280,610
Kaniksu	51,180	20,000	46,900	110,910	228,990	2,000	5,000	3,000	10,000	238,990
Kootenai	41,720	5,458	7,892	28,306	83,376	12,531	2,702	5,461	20,694	104,070
St. Joe	2,230	36,750	31,660	53,560	124,200	-	-	-	-	124,200
Totals	134,341	109,944	117,730	237,680	599,695	178,090	146,982	37,433	362,505	962,200





# THE STATE AND PRIVATE PROGRAM

## Expenditures - Calendar Year 1954

Area	Federal		State Funds	T. P. A. Funds	Totals
	712 Funds	432 Funds			
Clearwater T.P.A. (Clw.)	\$ 6,890	\$34,613	\$21,027	\$10,402	\$ 72,932
Potlatch T.P.A. (St. Joe)	2,322	33,749	25,629	8,371	70,071
Priest Lake T.P.A. (Kan.)	950	4,158	6,107	6,292	17,507
Totals	\$10,162	\$72,520	\$52,763	\$25,065	\$160,510

## Organization - 1954

Area	Camps	Employees	Contractors
Clearwater T.P.A.	3	106	6
Potlatch T.P.A.	2	90	0
Priest Lake T.P.A.	1	25	2
Totals	6	221	8

## Ribes Eradication Progress - 1954

Area	Initial	Rework Acres	Total	Man Days	Ribes	Per Acre	
	Work Acres		Worked Acres			Man Days	Ribes
Clearwater T.P.A.	750	1,540	2,290	2,720	185,500	1.19	81
Potlatch T.P.A.	240	3,850	4,090	3,670	723,000	.90	177
Priest Lake T.P.A.	-	690	690	710	12,000	1.03	17
Totals	990	6,080	7,070	7,100	920,500	1.00	130

## Control Status on State and Private Units (Acres)

Area	Unworked	Needing Rework	Needing		Totals
			Post Check	On Main- tenance	
Clearwater T.P.A. (Clw.)	18,950	14,100	14,650	22,260	69,960
Potlatch T.P.A. (St. Joe)	10,550	18,560	12,680	24,500	66,290
Priest Lake T.P.A. (Kan.)	10,210	8,700	19,620	19,470	58,000
Totals	39,710	41,360	46,950	66,230	194,250

STATE OF NEW YORK

IN SENATE

January 18, 1907.

REPORT OF THE COMMISSIONERS OF THE LAND OFFICE, IN ANSWER TO A RESOLUTION PASSED BY THE SENATE, MAY 1, 1906.

ALBANY: J.B. LEECH, STATE PRINTER, 1907.

Published by the State of New York, 1907.

CONTENTS.

REPORT OF THE COMMISSIONERS OF THE LAND OFFICE, IN ANSWER TO A RESOLUTION PASSED BY THE SENATE, MAY 1, 1906.

CHAPTER I. LANDS BELONGING TO THE STATE.

CHAPTER II. LANDS BELONGING TO THE STATE.

CHAPTER III. LANDS BELONGING TO THE STATE.

CHAPTER IV. LANDS BELONGING TO THE STATE.

CHAPTER V. LANDS BELONGING TO THE STATE.

CHAPTER VI. LANDS BELONGING TO THE STATE.

CHAPTER VII. LANDS BELONGING TO THE STATE.

CHAPTER VIII. LANDS BELONGING TO THE STATE.

CHAPTER IX. LANDS BELONGING TO THE STATE.

CHAPTER X. LANDS BELONGING TO THE STATE.

CHAPTER XI. LANDS BELONGING TO THE STATE.

CHAPTER XII. LANDS BELONGING TO THE STATE.

CHAPTER XIII. LANDS BELONGING TO THE STATE.

CHAPTER XIV. LANDS BELONGING TO THE STATE.

CHAPTER XV. LANDS BELONGING TO THE STATE.

CHAPTER XVI. LANDS BELONGING TO THE STATE.

CHAPTER XVII. LANDS BELONGING TO THE STATE.

CHAPTER XVIII. LANDS BELONGING TO THE STATE.

UNITED STATES DEPARTMENT OF AGRICULTURE

Forest Service

Region One

BR  
REPORTS  
Annual - 1954

WHITE PINE BLISTER RUST CONTROL

Clearwater National Forest

Prepared by: M. C. Riley  
D. F. Williams

Approved: January 10, 1955  
H. E. Swanson  
Assistant Regional Forester





# BLISTER RUST CONTROL, CLEARWATER NATIONAL FOREST, 1954

## I. INTRODUCTION

The twenty-seventh consecutive year of blister rust control work in the Clearwater area was characterized by the Forest Service assuming the added responsibility for administration and direction of the work on state and private lands. Unification of administration of blister rust work has materially increased utilization of personnel and equipment to the benefit of both programs.

Ribes eradication continued on approximately the same scale as last year. Three camps were operated on national forest units and three on state and private units.

## II. 1954 FIELD PROGRAM

### 1. Expenditures, Calendar Year 1954

#### Expenditures - Clearwater National Forest

Source of Funds	National Forest Program Idaho	State & Private Program Idaho	Total Program Idaho
<b>Federal:</b>			
Leadership	\$ 8,422	\$ 6,890	\$ 15,312
Control	83,825	34,613	118,438
KV	4,903	—	4,903
<b>Subtotal</b>	<b>97,150</b>	<b>41,503</b>	<b>138,653</b>
<b>Cooperative</b>			
State	—	21,027	21,027
C.T.P.A.	—	10,402	10,402
<b>Subtotal</b>	<b>—</b>	<b>31,429</b>	<b>31,429</b>
<b>Totals</b>	<b>\$97,150</b>	<b>\$72,932</b>	<b>\$170,082</b>

## 2. Organization, 1954

The BRC staffman was responsible for all phases of blister rust control work on the Clearwater area and was also in charge of the operation of the Pierce warehouse and related facilities. The assistant was responsible for all checking, survey, and the contract program. Robert F. Weholt, unit supervisor, assisted in the direction of camp field operations.

Program	Camps	Employees	Contractors
National Forest	3	91	4
State and Private	3	106	6
Totals	6	197	10

## 3. Progress on All Ribes Eradication, 1954

Two of the national forest camps were located in the excellent white pine pole stands in French Creek and in the Eldorado-Fan Creek drainages. The crews from these camps performed rework as an extension of that done in previous seasons. In French Creek the necessary protection of the south end of the white pine area was completed except for a small extension which was determined by survey during the current season. In the Fan Creek Unit, the necessary work was completed on the west end of the unit as well as the remainder of the unit which is accessible from existing roads. Future work in both of the above units will be facilitated by road work already started or to be done next spring. Crews from the third camp completed the rework needed in that portion of the sale area in the Sheep Mountain Unit which was not relogged in 1953. This consisted primarily of roadside ribes elimination along with a few upland ribes concentrations. Men destined for this camp completed stream type work in Orofino and Rosebud Creeks before the camp opened.

National forest camps expended KV funds whenever feasible. All of this money available in the Sheep Mountain Unit was used. KV funds also financed the work in Orofino and Rosebud Creeks and some late season work in the Dan Lee-Swede Creek Unit with a crew quartered at the Musselshell brush camp.

Work on state and private lands continued according to schedule on four of the best white pine units. From the Hildebrand camp, initial eradication was completed on Orofino Creek in an area logged in 1950 and on the West Fork of Canal Gulch where logging was completed in 1949. These crews also finished the needed rework in Flat Creek and Hildebrand Creek, as determined by the 1954 post check, and started the last rework in Orofino Creek near the national forest boundary. Crews from the Deer Creek camp completed the rework necessary in main Deer Creek and



practically finished needed work in the North Fork of Reeds Creek. Initial ribes eradication was started this year in Washington Creek by a 15-man spray crew. This work commenced at the south end of the area and will progress northward in an orderly manner. The method to be used will be either hand eradication, broadcast spraying, or selective spraying as determined by the intensive strip survey of the entire area. Chemical work will be done one year ahead of hand eradication on all blocks needing both types of treatment. It will require several years to complete the initial work on this unit.

Areas covered were placed on maintenance where ground conditions had stabilized. Maintenance standards, except where ribes seedlings were present, were also attained on areas logged too recently to be placed in that category.

Aids in attaining schedule quotas were the full work season uninterrupted by fire suppression duties and a plentiful supply of good labor. Muddy roads, due to a late spring and generally wet season, made difficult the establishment, maintenance, and supplying of the camps at French Creek, Fan Creek, and Washington Creek.

Training for blister rust control work consisted of an indoctrination course, the usual chart and field practice, and general safety training augmented by weekly camp safety meetings. All blister rust crews were given one day of fire training by district rangers.

Program	Initial	Rework	Total	Man	Ribes	Per Acre	
	Work Acres		Worked Acres			Man Days	Ribes
National Forest	-	2,290	2,290	2,750	279,800	1.20	122
State and Private	750	1,540	2,290	2,720	185,500	1.19	81
Totals	750	3,830	4,580	5,470	465,300	1.19	102

#### 4. Chemical Ribes Eradication, 1954

All camps made full use of chemicals. Power spraying was used most extensively although knapsack sprayers, Hi-Fog guns, and the decapitation method were employed where practicable. Truck-mounted sprayers were used exclusively in Orofino Creek and Rosebud Creek and primarily at Sheep Mountain. The French Creek camp used portable power spray units considerably. The Washington Creek crew worked entirely from truck-mounted power sprayers. Two rigs operated full time with the third used intermittently and as stand by. On Hildebrand Creek in one block of 20 acres which was clear cut in 1950, a truck-mounted power sprayer operated. From three to six nozzles were employed on each power sprayer.

A new type of sprayer designed this season was a Bean-Royal 30 pump and Ford engine mounted on a Dodge Power Wagon equipped with a winch. This



proved very satisfactory in traversing steep grades in older sale areas where conventional trucks were not adequate. Much future use is contemplated for this equipment, especially on lands where the caterpillar skidding method resulted in many steep grades.

The following table shows data for chemical eradication:

Program	Acres	Man Days	Ribes	Gallons
National Forest	224	433	87,100	34,340
State and Private	554	601	164,100	35,350
Totals	778	1,034	251,200	69,690

#### 5. Contract Ribes Eradication, 1954

Accomplishments under this phase of the program were less than in previous seasons. There was a dearth of potential contractors and only two with previous experience returned. Four contracts were completed by a four-man team and one by a two-man team. The first contracts on national forest lands in the Clearwater area were completed on the Beaver Creek plantation. The four-man group worked two 80-acre contracts here. On state and private lands, an area of 25 acres on Hildebrand Creek and 85 acres in the Jaype Unit were worked by the four-man group and 73 acres in this unit were completed by the two-man team.

Data on 1954 contracts are as follows:

Program	Number of Contracts	Acres	Man Days	Ribes	Amount Paid
National Forest	2	160	184	1,270	\$2,357
State and Private	3	183	206	1,180	2,497
Totals	5	343	390	2,450	\$4,854

### III. CONTROL STATUS

#### 1. Checking and Surveys

All lots completed by hand eradication crews were given the standard lot check. Contract eradication areas were examined with the checker-flanker system. Areas treated with chemical were not checked during the current season.

On portions of seven national forest units, a post check was conducted on 5,782 acres. Results show 1,023 acres placed on maintenance, 4,301 acres needing rework, and 458 acres scheduled for post check because the areas are not yet stabilized. A pine disease survey was made on 2,051 acres in

four units. Much of this survey was to determine what adjustments, if any, were necessary in the forthcoming appraisal of some of the present program units. Final results have not yet been evaluated.

## 2. Summary of Ownership and Control Status

Status	National Forest Units (Acres)	State & Private Units (Acres)	All Units (Acres)
OWNERSHIP			
Federal	192,980	3,390	196,370
State	4,460	15,440	19,900
Private	16,890	51,130	68,020
Total	214,330	69,960	284,290

## CONTROL STATUS

Immature Stands:			
Unworked	9,150	18,950	28,100
Needing rework	16,890	14,100	30,990
Needing post check	14,510	14,650	29,160
On maintenance	13,260	22,260	35,520
Subtotal	53,810	69,960	123,770
Mature Stands:			
Unworked	97,930	-	97,930
Deferred rework	46,180	-	46,180
On maintenance	16,410	-	16,410
Subtotal	160,520	-	160,520
Total All Stands	214,330	69,960	284,290

## NATIONAL FOREST UNITS

On lands within the national forest units accomplishments are in line with allotments. Satisfactory individual progress is being secured. All stabilized areas are being placed on maintenance with the current working. Where partial cutting has been done, any ribes occurring following this disturbance are being removed before they produce seed.

The past field season marked the end of the first five-year period in the 20-year plan. Objectives set in 1950 are not being met. Efficiency standards are more rigid and more work is required to meet these standards than was anticipated when original estimates were made. Other contributing factors include rising costs for equipment, supplies and wages,



and reductions in appropriations. A reappraisal is being made of the first five-year period units to make estimates more realistic.

The effects of the accelerated cutting program of the last two years on national forest lands is just now being felt in the blister rust program. It is planned that sufficient KV collections will be made to finance the blister rust control work on all white pine sales. Starting in 1955 the only work necessary on some sale areas will be financed by KV funds.

#### STATE AND PRIVATE UNITS

On state and private lands satisfactory progress is being made to keep planned work on schedule. The rework remaining is generally in scattered blocks and the amount is being materially reduced each year. Progress is such that it was possible to start initial ribes eradication in the Washington Creek Unit. With the anticipated continual reduction of rework elsewhere, it is planned to increase the amount of work each year in this unit.

Relogging on state and private lands is continuing. While sufficient time has not yet elapsed to appraise fully all effects of this disturbance, observations thus far are encouraging. After a minimum of one full growing season, an examination of many of these relogged areas failed to reveal any new ribes germination resulting from the disturbance. This was true whether horse skidding or jammer skidding was employed.

UNITED STATES DEPARTMENT OF AGRICULTURE

Forest Service

Region One

BR  
REPORTS  
Annual - 1954

WHITE PINE BLISTER RUST CONTROL

St. Joe National Forest

Prepared by: H. J. Hartman  
W. F. Painter

Approved: January 10, 1955  
H. E. Swanson  
Assistant Regional Forester





## BLISTER RUST CONTROL, ST. JOE NATIONAL FOREST, 1954

### I. INTRODUCTION

Blister rust control was continued on lands of the St. Joe National Forest and Potlatch Timber Protective Association for the twenty-sixth consecutive year. The paramount objective is to protect the maximum future volume of white pine with the minimum expenditure.

The blister rust control activities of the Bureau of Entomology and Plant Quarantine were transferred to the Forest Service on January 1, 1954. This reorganization and consolidation proved both effective and efficient. Considerable savings were made possible and blister rust control work is now more closely coordinated with other timber management activities of the forest.

All blister rust control activities were directed toward the protection of white pine stands comprising the present program. The labor supply was adequate and labor turnover was very low.

### II. 1954 FIELD PROGRAM

Nineteen hundred fifty-four was the fifth and last year of the present five-year program inaugurated in 1950. The second five-year program is now being prepared. Total expenditures for calendar year 1954 were \$37,000 less than 1953.

#### 1. Expenditures, Calendar Year 1954

##### Expenditures - St. Joe National Forest

Source of Funds	National Forest Program Idaho	State & Private Program Idaho	Total Program Idaho
Federal			
Leadership Control	\$ 10,787 <u>321,196</u>	\$ 2,322 <u>33,749</u>	\$ 13,109 <u>354,945</u>
Subtotal	331,983	36,071	368,054
Cooperative			
State	-	25,629	25,629
P.T.P.A.	- <u>          </u>	<u>8,371</u>	<u>8,371</u>
Subtotal	-	34,000	34,000
Totals	\$331,983	\$70,071	\$402,054

cover. All contracts let were completed by the end of the 1954 field season. There are 400 acres surveyed for contracting in 1955. Ribes eradication by contract will be increased as rapidly as reliable contractors can be found.

Program	Number of Contracts	Acres	Man Days	Ribes	Amount Paid
National Forest	5	290	370	2,140	\$9,163

### III. CONTROL STATUS

#### 1. Checking and Surveys

The checking organization consisted of 18 checkers. Checking activities were equally divided between regular and post check. The regular check was kept current as the ribes eradication work progressed to facilitate the necessary rework and to determine how efficiently the work was being performed by each individual worker. A total of 18,000 acres were inspected by regular check and 17,000 acres of maintenance and post check areas were surveyed. About 20 percent of the maintenance area checked reverted to the rework classification and 40 percent of the post check acreage went to maintenance.

Small scale disease surveys in five of the present control units indicated that 1951 was a very favorable year for the spread and intensification of blister rust on western white pine. Only trees over two feet and under nine feet in height were examined. Fifteen to 22 percent of the trees examined were infected with blister rust. Most of the infection occurred in 1951 but considerable 1950 pine infection was also present. Less than 50 percent of this infection will develop into killing cankers. The summer and fall weather of 1954 appeared to be favorable for both local intensification and long distance spread of blister rust. Additional studies of blister rust behavior under all conditions are urgently needed.

#### 2. Summary of Ownership and Control Status

There are 27 units comprising 124,200 acres in the present Forest Service program. No additional control work is planned for the white pine stands of the Bird, Malin, Eagle, Quartz, Tumbledown, Bruin, Gold, and Simmons Creek drainages. These lands are not in the present program. The disease survey conducted on these mature stands in 1951 showed that the present timber crop must be harvested within the next 20 to 30 years to avoid heavy loss from blister rust.

The present control program on state and private lands is composed of 16 units comprising 66,290 acres. Outside the present control area are 140,000 acres of state and private lands representing excellent mature white pine stands or highly productive units of recent cutover. No additional protection work is planned for these lands until control work



on the present program units is completed or additional funds are made available for expanded control activities.

The following table gives the status of the present program units:

Status	National Forest Units (Acres)	State & Private Units (Acres)	All Units (Acres)
OWNERSHIP			
Federal	84,640	12,990	97,630
State	12,420	16,630	29,050
Private	27,140	36,670	63,810
Total	124,200	66,290	190,490
CONTROL STATUS			
Immature Stands:			
Unworked	2,230	10,550	12,780
Needing rework	36,750	18,560	55,310
Needing post check	31,660	12,680	44,340
On maintenance	53,560	24,500	78,060
Total	124,200	66,290	190,490





UNITED STATES DEPARTMENT OF AGRICULTURE

Forest Service

Region One

BR  
REPORTS  
Annual - 1954

WHITE PINE BLISTER RUST CONTROL

Kaniksu National Forest

Prepared by: H. J. Viche  
H. J. Faulkner

Approved: January 10, 1955  
H. E. Swanson  
Assistant Regional Forester

THE UNIVERSITY OF CHICAGO

CHICAGO, ILLINOIS

1900

RECEIVED  
JAN 10 1900

THE UNIVERSITY OF CHICAGO

CHICAGO, ILLINOIS

RECEIVED  
JAN 10 1900

THE UNIVERSITY OF CHICAGO  
CHICAGO, ILLINOIS  
1900

## BLISTER RUST CONTROL, KANIKSU NATIONAL FOREST, 1954

### I. INTRODUCTION

Two major changes took place in the Kaniksu National Forest blister rust control program during the past year. The control area was increased by the addition of seven control units in the Clark Fork drainage in Montana, which were formerly a part of the Cabinet National Forest. The functions of the Bureau of Entomology and Plant Quarantine, which included the administration of the cooperative control program on state and private lands were transferred to the Forest Service.

The Kaniksu National Forest program now includes the following active units:

National Forest Units in Idaho	- 26
National Forest Units in Washington	- 9
National Forest Units in Montana	- <u>7</u>
Total National Forest Units	- 42
State and Private Units in Idaho	- <u>10</u>
Total Units Kaniksu National Forest Program	- 52

### II. 1954 FIELD PROGRAM

The 1954 season was the fifth of the present seven-year program on the forest. Progress and accomplishments will be summarized, units re-analyzed, and a new five-year program prepared during the coming winter.

Due to heavy rains during most of the season, 2,000 eradication man-days were lost, thereby reducing accomplishments and increasing man-day costs. During wet weather, crews performed such work as pruning infected trees, fire and blister rust training, constructing work trails, camp construction, etc. The heavy loss in field time due to rain was partially offset by a very light fire season.

After the close of the eradication season, four new camp sites were cleared and camps partially constructed for use during the 1955 season. One-half mile of project road was constructed from the old dry camp site on Minton Ridge to a new location on the South Fork of Martin Creek.

An extensive safety program has been under way for the past three years. Through constant vigilance and thorough training, a record has been achieved of 558,000 man-hours worked without a lost time accident. This includes time spent on fires and spruce beetle control as well as BRC.

During the 1954 season, the planting program was comparable to that of the last three seasons. A total of 175,000 western white pine seedlings were planted on 250 acres. Plantings were distributed over seven control units.



1. Expenditures, Calendar Year 1954

Expenditures - Kaniksu National Forest

Source of Funds	National Forest Program			State & Private Program			Total Program		
	Idaho	Mont.	Wash.	Total	Idaho	Idaho	Mont.	Wash.	Total
<b>Federal</b>									
Leadership	\$ 7,673	\$ 2,002	\$ 4,773	\$ 14,448	\$ 950	\$ 8,623	\$ 2,002	\$ 4,773	\$ 15,398
Control	165,430	47,720	104,984	318,134	4,158	169,588	47,720	104,984	322,292
KV	3,004	-	1,288	4,292	-	3,004	-	1,288	4,292
Subtotal	176,107	49,722	111,045	336,874	5,108	181,215	49,722	111,045	341,982
<b>Cooperative</b>									
State	-	-	-	-	6,107	6,107	-	-	6,107
P.L.T.P.A.	-	-	-	-	6,292	6,292	-	-	6,292
Subtotal	-	-	-	-	12,399	12,399	-	-	12,399
Totals	\$176,107	\$49,722	\$111,045	\$336,874	\$17,507	\$193,614	\$49,722	\$111,045	\$354,381

## 2. Organization, 1954

Eight of the national forest camps were located in the Priest River drainage in Idaho and Washington and one 50-man camp was operated in the Pilgrim Creek drainage in Montana. The State and Private camp was located in the Big Creek Unit in Idaho.

Two unit supervisors, Robert J. McCarthy and Norman C. Perring, supervised the work of the force account camps. James A. Sinclair directed the contracting program. Quentin W. Larson supervised checking and survey activities. Twenty-five men were employed on this phase of the program.

Program	Camps	Employees	Contractors
National Forest	9	325	16
State and Private	1	25	2
Totals	10	350	18

## 3. Progress on Ribes Eradication, 1954

Camp work assignments and objectives for 1954 were met or exceeded in practically all cases. Maintenance standards were attained on all stabilized areas where ribes populations made the complete removal of the bushes feasible.

Initial eradication on 206 acres of cutover lands was financed from KV funds. This included 60 acres of chemical eradication with a truck-mounted sprayer.

The 25-man camp financed from cooperative funds worked on state and private lands in the Big Creek drainage. Man-day costs per acre were relatively high due to the presence of numerous suppressed ribes associated with a dense brush cover. Cooperative funds were exhausted by mid-August and the camp was financed from federal funds for the balance of the season. The crew continued to work from the same camp location on an adjacent national forest unit.

Accomplishments for 1954 are shown in the following table:

Program	Initial		Total		Per Acre		
	Work Acres	Rework Acres	Worked Acres	Man Days	Ribes	Man Days	Ribes
National Forest	2,350	12,170	14,520	10,790	863,000	.74	59
State and Private	-	690	690	710	12,000	1.03	17
Totals	2,350	12,860	15,210	11,500	875,000	.76	58

#### 4. Chemical Ribes Eradication, 1954

The use of chemical has increased with the improvement of equipment, methods of application, and the development of more effective chemicals and formulations. Chemical eradication has greatly increased the effectiveness of the control effort and reduced costs and man-power requirements.

The following table shows the increase of chemical used during the past five years:

<u>Year</u>	<u>Gallons Chemical</u>
1950	31,100
1951	49,535
1952	95,750
1953	164,700
1954	246,540

To facilitate the task of truck-mount spraying, two spur roads were built in the Diamond Peak Unit, and the Kalispell Rock road was extended for one-half mile. A total of 1.2 miles of road was built this season for truck-mount spray purposes.

At the peak of the 1954 season, five truck-mounted and five portable sprayers were in operation. In addition to power spraying, back-pack units were used in eight out of the 10 camps on small or isolated areas.

Chemical ribes eradication is summarized in the following table:

<u>Program</u>	<u>Acres</u>	<u>Man Days</u>	<u>Ribes</u>	<u>Gallons</u>
National Forest	933	1,880	598,000	246,540

#### 5. Contract Ribes Eradication, 1954

The 1954 contract program showed a small reduction from the 1953 level. Eighteen contractors worked 920 man days and received \$18,125 in 1954. This reduction was not the result of less emphasis on this phase of the control program, but rain reduced the effective time contractors worked in the field. A large contract program is planned for next year. The layout has been completed on 12 areas and they will be awarded early in the spring of 1955.

<u>Program</u>	<u>Number of Contracts</u>	<u>Acres</u>	<u>Man Days</u>	<u>Ribes</u>	<u>Amount Paid</u>
National Forest	22	1,509	870	38,000	\$17,098
State and Private	2	69	50	1,000	1,027
Totals	24	1,578	920	39,000	\$18,125



### III. CONTROL STATUS

#### 1. Checking and Surveys

Upon completion of all hand-eradicated areas, a regular check was performed. Areas that did not meet specified standards were immediately reworked. One regular checker was assigned to each camp and two to contract checking. Fifteen additional checkers post checked 21,000 acres for planning future work. A high percent of area to be worked in 1955 was post checked this year. All post check was performed by the checker-flanker method.

Stocking and pine damage surveys were run on 4,750 acres of reproduction and pole stands. The surveys were run after the close of the regular eradication season by members of the permanent and temporary overhead organization.

No significant increase in infection over that of previous surveys was shown on maintenance areas. On submaintenance areas, infection has increased at a fairly uniform rate each year since the 1949 surveys with no heavy wave years apparent. Weather conditions this fall appeared to be favorable for a bad rust year.

#### 2. Summary of Ownership and Control Status

Status	National Forest Units (Acres)	State & Private Units (Acres)	All Units (Acres)
<b>OWNERSHIP</b>			
Federal	214,250	11,500	225,750
State	120	32,650	32,770
Private	24,620	13,850	38,470
<b>Total</b>	<b>238,990</b>	<b>58,000</b>	<b>296,990</b>
<b>CONTROL STATUS</b>			
<b>Immature Stands:</b>			
Unworked	51,180	10,210	61,390
Needing rework	20,000	4,700	24,700
Needing post check	46,900	19,620	66,520
On maintenance	110,910	19,470	130,380
<b>Subtotal</b>	<b>228,990</b>	<b>54,000</b>	<b>282,990</b>
<b>Mature Stands:</b>			
Unworked	2,000	-	2,000
Deferred rework	5,000	4,000	9,000
On maintenance	3,000	-	3,000
<b>Subtotal</b>	<b>10,000</b>	<b>4,000</b>	<b>14,000</b>
<b>Total All Stands</b>	<b>238,990</b>	<b>58,000</b>	<b>296,990</b>



## NATIONAL FOREST UNITS

The present control program on national forest lands includes 42 units comprising 238,990 acres. The control area was increased 27,000 acres this year by the addition of the seven Montana units.

The blister rust control program on the Kaniksu National Forest has become an integral part of timber management. All phases of white pine management plans, including cutting practices, control burning, planting, and stand improvement work, are closely coordinated with the blister rust control program.

National forest units contain 50,000 acres of fine 60-80-year-old pole in large blocks. It is estimated that pole stands in this age class will produce over one billion board feet of white pine at rotation age. The objective of placing these pole stands on maintenance during the present program is nearing accomplishment and will be completed by the end of the seven-year program.

Initial eradication has been performed on 185,810 acres in national forest units and rework on 111,957 acres. As a result of 1954 eradication and post check, 10,000 acres were placed on a maintenance basis.

## STATE AND PRIVATE UNITS

The state and private program is composed of 10 units with a total acreage of 58,000 and an estimated volume of 682 million board feet of white pine at maturity. Of this amount, the State of Idaho controls 33,000 acres.

The state owned Trapper Creek Unit, located in the Upper Priest River drainage, contains the highest values in the state and private program. There are approximately 6,000 acres of fine 40-60-year-old pole growing in a solid block. The stand is well stocked to white pine, Douglas fir, and larch. Forty-seven percent of the stocking is white pine. It has been estimated that this stand alone will produce 177 million board feet of white pine by the end of the present 120-year rotation period. Ribes populations have been reduced to a maintenance standard on 90 percent of the unit.

The Bear Creek, Caribou Creek, Fox Creek, and Big Creek Units contain 5,500 acres of well stocked 10-30-year-old white pine reproduction. The Fox Creek Unit has 800 acres of exceptionally fine 30-year-old reproduction established following logging in 1929. A small amount of work in 1955 will place this area on maintenance.

As a result of this year's eradication in the Big Creek Unit, 300 acres were placed on a maintenance basis making a total of 19,470 acres now on maintenance in state and private units.

UNITED STATES DEPARTMENT OF AGRICULTURE

Forest Service

Region One

BR  
REPORTS  
Annual - 1954

WHITE PINE BLISTER RUST CONTROL

Coeur d'Alene National Forest

Prepared by: F. J. Heinrich

Approved: January 10, 1955

H. E. Swanson

Assistant Regional Forester



## BLISTER RUST CONTROL, COEUR D'ALENE NATIONAL FOREST, 1954

### I. INTRODUCTION

Blister rust control accomplishments on the Coeur d'Alene National Forest under the 1950-1954 work plan fell short of the original estimates. This was due in part to ground disturbance and canopy openings in pole stands resulting from severe snow damage during the winters of 1949, 1950, and 1951. Several areas had to be removed from protected classification and additional work was needed. Effective man-day costs also exceeded the \$25.00 estimate.

Effective January 1, 1954, Fred J. Heinrich was transferred from the Bureau of Entomology and Plant Quarantine to the Forest Service. Clemens J. Pederson was assigned to the Magee Ranger District as district ranger.

### II. 1954 FIELD PROGRAM

Work efforts for 1954 were focused on the completion of currently needed work in young stands and to increase chemical ribes eradication on cut-over lands. Work was performed in working units 1, 2, 10, 19, 22, 23, 25, 27, 28, 32, 34, and 43. Chemical ribes eradication methods were used entirely in units 19 and 43. Contractors did the necessary work in units 25 and 34.

#### 1. Expenditures, Calendar Year 1954

##### Expenditures - Coeur d'Alene National Forest

Source  
of  
Funds

National Forest Program  
Idaho

Federal

Leadership

\$ 6,176

Control

130,211

KV

37,501

Total

\$173,888

#### 2. Organization, 1954

The field workload was divided into two groups with an experienced unit supervisor in charge of each division. One man directed the activities of six regular camps and the other unit supervisor was responsible for the contract ribes eradication program and checking on survey activities. Camp superintendents were of a young age group. All had considerable blister rust control experience although only two had previous campboss experience.



The safety program objectives as set up in the field work plan were met. There were no vehicle or lost time accidents. First aid training by a qualified instructor was made available to all employees.

Program	Camps	Employees	Contractors
National Forest	6	155	8

### 3. Progress on All Ribes Eradication, 1954

Accomplishments in acres worked and effective man days available exceeded preseason estimates. This was accomplished by low personnel turnover and practically no lost time due to fire suppression. Although considerable rain occurred during the early part of the season, lost time was held to a minimum through careful planning by the camp superintendents.

Program	Initial Work Acres	Rework Acres	Total Worked Acres	Man Days	Ribes	Per Acre	
						Man Days	Ribes
National Forest	950	3,750	4,700	5,350	232,700	1.14	50

### 4. Chemical Ribes Eradication, 1954

Chemical ribes eradication methods were used extensively for ribes suppression during the past season. Four truck-mounted power sprayers and two portable power units were used throughout the summer. On the Potter Creek 1951 prescribed burn area, 370 acres were treated. The 240 acres of cutover land sprayed within the East Fork of Steamboat Creek drainage was primarily roadside work. Hi-Fog guns and knapsack sprayers were used on minor stream type and other small selected areas.

During late fall, after plant defoliation, a special power spray job was performed on 40 acres of the 1952 Snyder Creek prescribed burn. In the 1953 experimental tests, excellent results were obtained from late fall application by adding nine gallons of fuel oil to the regular summer formula. In the formulation used this fall, the fuel oil was reduced to five gallons per 100 gallons of solution. The results showing the effectiveness of this job will not be known until early fall of 1955.

When chemical ribes eradication methods have been properly used, satisfactory results have been obtained. However, it now appears that a seedling problem might occur on some areas which supported fruiting ribes at the time of treatment. This has already occurred on Upper Sands Creek drainage and the Ames Creek area.

Program	Acres	Man Days	Ribes	Gallons
National Forest	910	1,590	170,580	167,660

#### 5. Contract Ribes Eradication, 1954

The contract ribes eradication program was very successful. The 14 men including contractors and helpers did excellent work and completed all contracts. The revised contract with its rigid ribes standard specifications worked satisfactorily. Twenty-three contracts were awarded with 11 located in the Brett Creek Unit and 12 in the Jordan Creek Unit. Award prices ranged from \$11.24 to \$19.50 per acre for an average of \$15.46. This represents a savings of approximately 25 percent over comparable work by regular crews. The outlook for an adequate ribes eradication program by contractors looks favorable for 1955.

Program	Number of Contracts	Acres	Man Days	Ribes	Amount Paid
National Forest	23	1,120	820	8,860	\$17,319

### III. CONTROL STATUS

#### 1. Checking and Surveys

A training program was set up again this year to train new checkers and to give refresher instructions to men who had previous checking experience. All checking personnel were required to meet specific performance standards. One checker was assigned to each camp. Checkers duties were to keep work checked as completed by crewmen, assist camp superintendents in establishing work area boundaries, and train men to lay string lanes.

Post check was performed on 6,500 acres of young pine stands. Only a small amount of systematic stocking and pine disease survey work was performed.

#### 2. Summary of Ownership and Control Status

Protection of white pine from blister rust in the present control units is behind the five-year schedule as established in 1950. However, sufficient progress was made during this period making it possible to add additional units to the control program in 1955. Fourteen hundred acres supporting young pine stands were classified as maintenance as a result of the current season's work. This places 143,800 acres on maintenance or supporting mature stands which will not require additional work to protect the present crop. This comprises over 50 percent of the 280,610 acres in the present control program.



Close integration of blister rust control with other forest activities is being practiced on the Coeur d'Alene National Forest. Although the blister rust problem remains serious, control progress is being made and white pine is being grown on selected control units.

Summary of Ownership and Control Status - Coeur d'Alene National Forest

Status	National Forest Units (Acres)
<b>OWNERSHIP</b>	
Federal	265,550
State	4,400
Private	10,660
Total	280,610
<b>CONTROL STATUS</b>	
Immature Stands:	
Unworked	30,061
Needing rework	30,846
Needing post check	16,768
On maintenance	31,644
Subtotal	109,319
Mature Stands:	
Unworked	65,629
Deferred rework	93,100
On maintenance	12,562
Subtotal	171,291
Total All Stands	280,610

UNITED STATES DEPARTMENT OF AGRICULTURE

Forest Service

Region One

BR  
REPORTS  
Annual - 1954

WHITE PINE BLISTER RUST CONTROL

Kootenai National Forest

Prepared by: M. D. Oaks

Approved: January 10, 1955  
H. E. Swanson  
Assistant Regional Forester





# BLISTER RUST CONTROL, KOOTENAI NATIONAL FOREST, 1954

## I. INTRODUCTION

The blister rust control program on the Kootenai National Forest in 1954 consisted of 12 units of immature stands with 83,000 acres and three units of mature stands containing 21,000 acres. The current season's work marks the final phase of accomplishment in the first five-year program. The five-year program placed emphasis on the high value pole and reproduction stands. Its goal was placing these units on maintenance before extensive cutting in the mature units made it necessary to shift the workload to these units. With minor exceptions, this has been accomplished.

## II. 1954 FIELD PROGRAM

The field program for 1954 consisted of three 15-man camps, one road camp, and two pack camps. The road camp was located in the Burnt Creek Unit and the pack camps were located in the Red Top and Cyclone Creek Units.

Late snow-melt in the work areas made it impossible to place the camps in the field as early as in normal years. The last camp was established on July 6.

Second and third working in Burnt Creek Unit was centered in the headwaters of Grizzly Creek. Working conditions were difficult with scattered ribes in the Burnt Creek drainage. Cyclone Creek camp resumed work where the 1953 work left off and placed all the area worked this year on maintenance, except for the stream type. The Red Top Creek camp performed second and third work in the upper end of the drainage. Their work assignment was completed except for 20 acres of upland area. Camp work area assignments were not completed in two of the three camps this season because of unfavorable weather at the start and finish of the field season. The resulting ineffective time was greater than for any one season during the past 10 years. College men made up the bulk of temporary employees and were comparable with last season's employees. The three camp foremen had considerable eradication experience, but had not previously acted in this capacity. This required an unusual amount of administrative training since it was the first year that experienced foremen have not been available.

1. Expenditures, Calendar Year 1954

Expenditures - Kootenai National Forest

Calendar Year 1954

Source of Funds	National Forest Program Montana
Federal	
Leadership	\$ 3,025
Control	54,659
KV	-
Total	\$57,684

2. Organization, 1954

Program	Camps	Employees	Contractors
National Forest	3	45	None

3. Progress on All Ribes Eradication, 1954

Program	Initial Work Acres	Rework Acres	Total Worked Acres	Man Days	Ribes	Per Acre	
						Man Days	Ribes
National Forest	38	1,703	1,741	1,269	41,022	72	24

4. Chemical Ribes Eradication, 1954

Program	Acres	Man Days	Ribes	Gallons
National Forest	78	90	17,670	21,608

Chemical eradication was used extensively again this season in the Burnt Creek Unit. Spraying on main Burnt Creek continued on to the mouth of Grizzly Creek from where it was discontinued in 1953. Upland spraying of approximately 50 acres in the head of Grizzly Creek was also accomplished this season. A light weight portable power sprayer was used

effectively in this work. A slightly heavier, slow-speed motor was installed on this unit in 1953, which largely corrected its major deficiency. Further refinements are needed in this sprayer, but it definitely has its place in power spraying and should not be dropped because of some minor disadvantages.

### III. CONTROL STATUS

#### 1. Checking and Surveys

Four checkers were trained this season to handle this phase of the program. All of the areas worked were checked with the exception of the areas sprayed. Post check was performed on approximately 1,500 acres this season.

A modified disease and stocking survey was run by the combined checking force in the North Fork Keeler Creek Unit. On the basis of this survey, combined with on-the-ground inspections, North Fork Keeler and Main Keeler Units were dropped from the program. These units were in the deferred mature category and have had no work in them since 1935.

#### 2. Summary of Ownership and Control Status

Status	National Forest Units (Acres)	All Units (Acres)
OWNERSHIP		
Federal	102,512	102,512
Private	1,558	1,558
Total	104,070	104,070
CONTROL STATUS		
Immature Stands:		
Unworked	41,720	41,720
Needing rework	5,458	5,458
Needing post check	7,892	7,892
On maintenance	28,306	28,306
Subtotal	83,376	83,376
Mature Stands:		
Unworked	12,531	12,531
Deferred rework	2,702	2,702
On maintenance	5,461	5,461
Subtotal	20,694	20,694
Total All Stands	104,070	104,070



The objective of the first five-year period in placing present program units on maintenance was not entirely met. In the undisturbed units, the maintenance goal is practically a reality, but in the units where disturbances have occurred, i.e., access roads and salvage logging of spruce, additional work will have to be performed to keep ribes populations in check until the areas are again stabilized. These areas are primarily in the protective zone where logging of mature timber is now in progress.

UNITED STATES DEPARTMENT OF AGRICULTURE

Forest Service

Region One

BR  
REPORTS  
Annual - 1954

WHITE PINE BLISTER RUST CONTROL

National Parks

Prepared by: J. C. Gynn  
C. M. Chapman

Approved: January 10, 1955  
H. E. Swanson  
Assistant Regional Forester



## BLISTER RUST CONTROL, NATIONAL PARKS, 1954

(Glacier, Yellowstone, Rocky Mountain)

Leadership and technical direction of blister rust control on National Parks in the Northwest, formerly provided from the Bureau of Entomology and Plant Quarantine office in Spokane, Washington, were continued as before from the Forest Service regional office, Missoula, Montana, for Glacier, Yellowstone, and Rocky Mountain National Parks. Responsibility for these services on Mount Rainier was transferred to the Forest Service, Region Six, Portland, Oregon.

All objectives of the 1954 ribes eradication program on Glacier, Yellowstone, and Rocky Mountain National Parks were accomplished as scheduled. Late spring snows remaining in the work areas necessitated several work plan adjustments. Time lost to firefighting was negligible.

Considerable impetus was given the work by adapting portable power spraying equipment for use in the high, rugged white bark pine areas. This type of equipment is also proving very successful in the rework program and will greatly facilitate ribes seedlings eradication in maintenance control.

Of the 24,340 acres comprising the control area, 1,280 acres of initial work remains for completion in 1955. The 16,950 acres on maintenance will require periodic surveys to determine location of seedling spots occurring on ground disturbances caused by timber blowdowns, snowslides, and erosion. Work schedules have been prepared for the 6,110 acres requiring varying degrees of rework.

The National Park Service has requested the assistance of the Blister Rust Control Division to evaluate and determine if certain extensions and additional control units are advisable and economically feasible. With their representatives, a plan for inspecting and surveying the areas in 1955 has been made for their consideration.

Scouting for the spread of the rust showed the disease is intensifying and is now well established in the unprotected white pine stands in the north portion of Yellowstone Park.

Separate reports for each national park have been prepared.



A summary of expenditures and progress of control work follows:

1. Expenditures, Calendar Year 1954

National Park	National Park BRC	Forest Service Leadership and Technical Direction	Total
Glacier	\$20,818	\$3,447	\$24,265
Yellowstone	34,691	3,447	38,138
Rocky Mountain	9,566	1,723	11,289
Totals	\$65,075	\$8,617	\$73,692

2. Organization, 1954

National Park	Camps	Employees
Glacier	2	20
Yellowstone	2	42
Rocky Mountain	1	6
Totals	5	68

3. Progress on Ribes Eradication, 1954

National Park	Initial Work Acres	Rework Acres	Total Worked Acres	Man Days	Ribes	Per Acre	
						Man Days	Ribes
Glacier	-	800	800	850	41,000	1.06	51
Yellowstone	840	1,530	2,370	1,910	627,000	.81	265
Rocky Mountain	-	830	830	270	3,500	.33	4
Totals	840	3,160	4,000	3,030	671,500	.76	168

4. Status of Present Control Area

National Park	Control Area Acres	Initial Work Acres	Rework Acres	Maintenance Acres	Unworked Acres
Glacier	5,140	5,140	9,590	3,450	-
Yellowstone	13,100	11,820	7,010	8,040	1,280
Rocky Mountain	6,100	6,100	4,370	5,460	-
Totals	24,340	23,060	20,970	16,950	1,280

## BLISTER RUST CONTROL, GLACIER NATIONAL PARK, 1954

### I. INTRODUCTION

The original purpose of white pine blister rust control in Glacier National Park was to protect four small areas of white pine at Park Headquarters, Lake McDonald, East Glacier (Rising Sun), and Two Medicine Lake. For a large specimen area, the Oldman Lake Unit was later added to the program. The National Park Service is now considering enlarging the white pine units at Park Headquarters and East Glacier and extending the east protection zone limits at Two Medicine Lake. All initial work has been completed and the four original areas are on a near maintenance control basis. Second work at Oldman Lake is progressing as planned.

The suppression of ribes seedlings is the main problem encountered for maintenance control. The troublesome seedling areas can be economically treated with chemicals, using portable power sprayers. Heretofore, the use of power spraying equipment in the development areas has been discouraged by Park officials because of possible damage to vegetation other than ribes. It is now known power spraying for ribes seedling suppression can be done selectively with negligible damage to other growth. The Park is obtaining power equipment for this purpose in 1955.

### II. 1954 FIELD PROGRAM

Objectives of the 1954 program were to perform ribes seedling suppression in the Two Medicine area and second working at Oldman Lake. All work scheduled for 1954 was completed as planned. Work started June 14 and continued without interruption until September 10, about 10 days longer than usual. Two camps were operated in 1954. Peak employment was 20 men. A 12-man unit was located at the Two Medicine road camp and a six-man batching camp at Oldman Lake. One superintendent and a checker served both crews. The batching camp used for the first time in this park resulted in increased efficiency, reduced packing costs, and eliminated the costly installation of a Government-subsisted messhall. Crew morale was at a high level and nearly all crewmen remained on the job for the full season.

#### 1. Expenditures, Calendar Year 1954

##### U. S. Forest Service:

Leadership and technical direction	\$ 3,447
------------------------------------	----------

##### National Park Service:

Blister rust control funds	<u>20,818</u>
----------------------------	---------------

Total expenditure	\$24,265
-------------------	----------



## 2. Progress on Ribes Eradication, 1954

Area	Rework Acres	Total Worked Acres	Man Days	Ribes	Per Acre	
					Man Days	Ribes
Two Medicine	410	410	430	23,000	1.05	56
East Glacier	120	120	100	3,000	.83	25
Oldman Lake	270	270	320	15,000	1.19	56
Totals	800	800	850	41,000	1.06	51

### III. CONTROL STATUS

#### 1. Checking and Surveys

A regular check to determine efficiency was performed on all current year work. An additional 160 acres were surveyed to determine status of control. All surveys are on schedule as required in accordance with the maintenance control program.

#### 2. Summary of Control Status

Area	Needing Rework Acres	Post Check Acres	Maintenance Acres	Total Acres
Park Headquarters	70	-	620	690
Two Medicine	100	170	440	710
Lake McDonald	190	-	1,590	1,780
East Glacier	100	100	240	440
Oldman Lake	630	330	560	1,520
Totals	1,090	600	3,450	5,140

Excepting the Oldman Lake Unit, all areas requiring rework are producing seedlings. These areas will not be placed in the maintenance category until all ribes seed germination stops.

### IV. RECOMMENDATIONS

To continue rework at Oldman Lake and perform maintenance control on the Lake McDonald and Park Headquarters Units, the following is recommended:

39 man months. Average total seasonal employees - 13.

Lake McDonald and Park Headquarters - 5 men

Oldman Lake - 6 men (batching camp)

- 1 superintendent (serve both crews)

- 1 checker (serve both crews)

All employment based on three-month working season.

## BLISTER RUST CONTROL, YELLOWSTONE NATIONAL PARK, 1954

### I. INTRODUCTION

The three white pine blister rust control units in Yellowstone National Park are located at Mammoth Hot Springs, Mount Washburn and Craig Pass. All work is on schedule and in accord with the 1954-1959 program plan.

Infected limber pines (Pinus flexilis) were found approximately one mile from the Mammoth control unit in 1954. This indicates the disease is now well established in the unprotected white pine stands in the north portion of the Park.

Because of the progress of the work, consideration is now being given to enlarge two of the present control units. Surveys are planned on unprotected white pine areas in other portions of the Park to determine if control is practical.

### II. 1954 FIELD PROGRAM

The 1954 field program performed schedule maintenance control work in the Mount Washburn Unit and continued initial work in the Mount Washburn Extension at Carnelian Creek. All objectives were accomplished.

Two camps were operated in 1954 with a peak employment of 42 men. Two camp superintendents were employed; one checker served both camps. All men were trained in the Mammoth area until weather conditions were favorable for work at Mount Washburn and at the pack camp on Carnelian Creek. The men were carefully selected for the different methods of ribes eradication and intensively trained accordingly. By rotating pack camp crews with the Mount Washburn crews, a high morale was maintained. Most men stayed on the job for the entire season.

Improvements made on transportation vehicles increased safety and reduced travel time. Two-way radio communications in the camps increased administrative efficiency and a closer coordination of field activities.

#### 1. Expenditures, Calendar Year 1954

##### U. S. Forest Service:

Leadership and technical direction	\$ 3,447
------------------------------------	----------

##### National Park Service:

Blister rust control funds	34,691
----------------------------	--------

Total expenditure	\$38,138
-------------------	----------



## 2. Progress on Ribes Eradication, 1954

The accomplishments in each control unit were as follows:

Area	Initial	Rework	Total	Man	Ribes	Per Acre	
	Work Acres	Acres	Worked Acres	Days		Man Days	Ribes
Mammoth	-	430	430	150	3,000	.35	7
Mount Washburn	-	840	840	410	18,000	.49	21
Mount Washburn Ex.	840	260	1,100	1,350	606,000	1.23	551
Totals	840	1,530	2,370	1,910	627,000	.81	265

## 3. Chemical Ribes Eradication, 1954

Acres treated, 400; man days, 830; ribes destroyed, 533,000; gallons of spray solution, 21,170. Man-day requirements for initial chemical work in the Extension area were reduced 16 percent in 1954.

Two portable power spraying units were employed. The heavier unit was used in the Carnelian Creek stream type. The lighter unit was used for steep tributaries and remote upland portions when an adequate water supply was available. Nine Hi-Fog guns were used in high, rugged areas not accessible to power sprayers. Knapsack units were used to treat small ribes spots missed by the power units in 1953.

## III. CONTROL STATUS

### 1. Checking and Surveys

All current year work except 400 acres chemically treated were checked for efficiency immediately following working. To determine status of control 560 additional acres were surveyed. All checking and maintenance surveys are on schedule. Until ribes seed germination stops, control status surveys must be made periodically to locate the seedling spots for treatment. The 670 acres chemically treated in 1953 and 1954 will be checked in 1955.

### 2. Summary of Control Status

Area	Unworked	Needing	Post	Maintenance	Total
	Acres	Rework Acres	Check Acres	Acres	Acres
Mammoth	-	180	350	1,050	1,580
Mount Washburn	10	830	130	3,730	4,700
Craig Pass	-	-	60	3,260	3,320
Mount Washburn Ex.	1,270	1,000	1,230	-	-
Totals	1,280	2,010	1,770	8,040	13,100

Control standards must be maintained at a high level to insure protection to the highly susceptible white bark pine (P. albicaulis).

#### IV. RECOMMENDATIONS

In order to carry on scheduled maintenance control work in the Mount Washburn and Craig Pass areas and to complete initial work in the Mount Washburn Extension, the following is recommended for 1955:

96 man months. Average total seasonal employees - 32.

Mount Washburn - 5 men

- 1 foreman

Mount Washburn Extension - 24 men

- 1 superintendent (serve both camps)

- 1 checker (serve both camps)

To expedite the work and reduce costs, it is planned to purchase another portable power spraying unit for use in 1955.



## BLISTER RUST CONTROL, ROCKY MOUNTAIN NATIONAL PARK, 1954

### I. INTRODUCTION

The Longs Peak-Estes Cone white pine blister rust control unit is on a near maintenance control basis. High control standards are being maintained by a small crew eliminating seedlings still occurring in a few scattered areas. This work will continue until ribes seed germination stops.

National Park Service officials are considering the Boulder Creek drainage as a valuable additional protective unit. The area is an old burn containing a considerable amount of well distributed limber pine (Pinus flexilis) reproduction. At higher elevations, scattered patches of mature white pine trees missed by the fire constitute a continual seed source. The area would form a western extension to the present Longs Peak-Estes Cone control unit.

Inspections will be made in 1955 to determine the amount of white pine present and practicability of control in the Twin Sisters and Hidden Valley portions of the Park.

### II. 1954 FIELD PROGRAM

All work was confined to the south portion of the control unit and was completed as planned.

The crew was composed of a superintendent and five men. The superintendent also performed checking activities. The crew worked from the Park utility area until July 13 when a batching camp was installed at Jim's Grove in order to eliminate walking time to remote areas. The one-man dragline system was used exclusively because the ribes were few and scattered. All crewmen remained on the job the entire season. Ribes eradication work terminated September 11.

#### 1. Expenditures, Calendar Year 1954:

##### U. S. Forest Service:

Leadership and technical direction	\$ 1,723
------------------------------------	----------

##### National Park Service:

Blister rust control funds	<u>9,566</u>
----------------------------	--------------

Total expenditure	\$11,289
-------------------	----------



## 2. Progress on Ribes Eradication, 1954

Area	Rework Acres	Total Worked Acres	Man Days	Ribes	Per Acre	
					Man Days	Ribes
Longs Peak-Estes Cone	830	830	270	3,500	.33	4

### III. CONTROL STATUS

#### 1. Checking and Surveys

All current year work was checked for efficiency following working and any necessary mop up was performed immediately. One hundred additional acres were checked to determine status of control. A white pine and ribes count distribution survey was made on 2,030 acres in the proposed Boulder Creek Unit. From these data preliminary cost estimates will be prepared.

#### 2. Summary of Control Status

Area	Needing Rework Acres	Post Check Acres	Maintenance Acres	Total Acres
Longs Peak-Estes Cone	100	540	5,460	6,100

All post check acres will require future checking to locate the seedling spots still occurring. The 100 acres of rework is in stream type.

### IV. RECOMMENDATIONS

In order to continue maintenance control in the north portion of the Longs Peak-Estes Cone area, the following program is recommended for 1955:

18 man months

5 men

1 superintendent (also to serve as checker)

3-month working season

## SPREAD OF WHITE PINE BLISTER RUST

Scouting in Montana, Wyoming, Colorado, Idaho, and Utah, 1954

New infection centers of white pine blister rust found in 1954 show continuing intensification of the disease in the dry region adjacent to the Great Plains in Eastern Montana and Wyoming. Very little advancement beyond previously known limits of the disease is shown by the new infection locations.

Blister rust on white pines was found for the first time on the Crow Indian Reservation in Eastern Montana. Infection on ribes was found for the first time in Meagher and Big Horn Counties, Montana. Also on ribes in Fremont County, Wyoming, 24 miles south of a previously reported location. Another ribes infection center was found in Wheatland County, Montana, 20 miles west of a location reported in 1951.

### WHITE PINE INFECTION LOCATION

Big Horn County, Montana, Crow Indian Reservation near West Pryor Mountain, T. 6 S., R. 25 W., Sec. 9. The host Pinus flexilis was infected with aecia stage cankers.

### RIBES INFECTION LOCATIONS

1. Big Horn County, Montana, Crow Indian Reservation near West Pryor Mountain, T. 6 S., R. 25 W., Sec. 9. The infected host was Ribes montigenum.
2. Meagher County, Montana, adjacent to Lewis and Clark National Forest, Cooper Creek, 20 miles east of White Sulphur Springs, T. 9 N., R. 10 E., Sec. 15. The infected host was R. aureum.
3. Fremont County, Wyoming, adjacent to Bridger National Forest, near Atlantic City, and South Pass on Rock Creek, T. 29 N., R. 100 W., Sec. 11. The infected host was R. inerme.
4. Wheatland County, Montana, near Lewis and Clark National Forest on Daisy Dean Creek, 20 miles west of Harlowton, T. 8 N., R. 12 E., Sec. 14. The infected host was R. setosum and R. aureum.

No white pine blister rust has been found in Colorado up to September 1954. Pinon rust was found in the following locations in 1954: Roosevelt National Forest, Colorado; Cache National Forest, Utah; Caribou National Forest, Idaho; Bridger National Forest, Wyoming. This indicates conditions are also favorable for white pine blister rust.

# SCOUTING SUMMARY, 1954

Montana, Wyoming, Idaho, Colorado, Utah

Location	Drainage Scouted	Ribes Examined	Pine Examined	New Infection Centers	
				Ribes	Pine
<u>Montana</u>					
Lewis and Clark N. F.	4	230	710	2	-
Gallatin N. F.	1	60	50	-	-
*Crow Indian Reservation	1	10	10	1	1
<u>Wyoming</u>					
Yellowstone N. P.	6	1,630	1,230	-	-
Big Horn N. F.	2	150	690	-	-
Teton N. F.	3	460	140	-	-
Grand Teton N. P.	4	480	600	-	-
Bridger N. F.	2	100	-	-	-
Medicine Bow N. F.	6	660	820	-	-
Shoshone N. F.	3	930	890	1	-
<u>Idaho</u>					
Caribou N. F.	2	180	70	-	-
Targhee N. F.	1	20	40	-	-
<u>Colorado</u>					
Rocky Mountain N. P.	6	1,270	470	-	-
Roosevelt N. F.	4	570	50	-	-
<u>Utah</u>					
Cache N. F.	2	140	-	-	-
<hr/>					
Totals	47	6,890	5,770	4	1

\*Infected specimens collected by J. S. Meilke.

UNITED STATES DEPARTMENT OF AGRICULTURE

Forest Service

Region One

BR  
REPORTS  
Annual - 1954

DEVELOPMENT AND IMPROVEMENT OF BLISTER RUST CONTROL METHODS

Chemical Methods  
Ribes Ecology Studies

Prepared by: V. D. Moss

Approved: January 10, 1955  
H. E. Swanson  
Assistant Regional Forester





## DEVELOPMENT AND IMPROVEMENT OF BLISTER RUST CONTROL METHODS, 1954

### HIGHLIGHTS OF 1954 WORK

#### Spraying ribes after killing frost is effective

Heretofore, results have not been satisfactory in spraying ribes with aqueous solutions of 2,4,5-T after date of first killing frost. Now, by adding five percent stove oil to the conventional aqueous solution of 2,4,5-T (2,000 ppm a.e.), the spraying season can be extended into late fall with equally effective results. Stove oil is emulsified in water by first combining the oil and 2,4,5-T, then injecting the mixture under pressure into the sprayer tank preferably as it is filled with water. When ribes are undergoing natural defoliation, spray must be applied, wetting winter buds, stems, remaining leaves, and liberally drenching to puddle soil around root crowns without exposing roots. All ribes, six inches and taller, must be crown drenched. Smaller ribes that are readily visible should be crown drenched; otherwise, spray should be applied broadcast to area. Stove oil is injurious to white pine if terminal shoot is sprayed.

#### Esters of 2,4,5-T approved for spraying ribes

Three low volatile esters of 2,4,5-trichlorophenoxyacetic acid have been found acceptable by laboratory and field tests for spraying ribes. These are the (a) propylene glycol butyl ether ester, (b) butoxy ethanol ester, and (c) isooctyl ester. The proprietary material of butoxy ethanol ester and isooctyl ester may contain a hygroscopic agent.

#### Sticker-spreader-penetrant agent is not required in spray solution

It is no longer necessary to amend the conventional aqueous spray with a sticker-spreader-penetrant such as summer oil emulsion. The proprietary materials of 2,4,5-T now contain sufficient adjuvants so that the addition of more will not increase the effectiveness of spray solution. Summer oil emulsion may be used to facilitate marking of spray solution, if one wishes, at the time crews are undergoing training.

#### Stove oil is effective marker for aqueous solutions of 2,4,5-T

By adding two or three gallons of stove oil for each 100 gallons of water, the conventional aqueous spray of 2,4,5-T will closely resemble in physical character a straight oil solution on the foliage of ribes. Leaves will be made glossy from the oil and they will appear to have some transparency. To emulsify stove oil in water, first combine the oil and 2,4,5-T and then inject the mixture under pressure into the sprayer tank, preferably as it is filled with water. This mixture will injure white pine if terminal shoot is sprayed.

### Volume of spray is important to effectiveness of spraying

When the lethal amount of 2,4,5-T acid per gallon of water required to kill ribes has been determined, an increase in this amount per gallon will not necessarily increase the effectiveness of bush kill. On the other hand, increasing the volume of spray until it drips from foliage and soil is puddled around crowns of ribes will increase the percent bush kill for a particular strength of 2,4,5-T solution. To illustrate, a higher percent bush kill was obtained in applying three gallons of 1,000 ppm a.e. 2,4,5-T than in applying  $1\frac{1}{2}$  gallons of 2,000 ppm a.e. 2,4,5-T per milacre. Both milacres received equal amounts of 2,4,5-T acid. To illustrate further, the same percent bush kill was obtained in applying three gallons of 1,000 ppm a.e. 2,4,5-T per milacre as was obtained in applying three gallons of 2,000 ppm a.e. 2,4,5-T. Enough solution must be applied to wet leaves, stems, and all growing tips thoroughly to the point of dripping, then drenching to puddle soil around root crowns without exposing roots.

### Some herbicides found ineffective on ribes

Each field season new herbicides are tested for the control of ribes. The group listed hereunder were tested in 1953 and, on the basis of results in 1954, have been classed as ineffective herbicides for ribes in the western white pine region:

- PMU - (phenyl dimethyl urea)
- CMU - (chlorophenyl dimethyl urea)
- MH - (maleic hydrazide)
- 2,5-D - (2,5-dichlorophenoxyacetic acid)
- 3,4-D - (3,4-dichlorophenoxyacetic acid)

### Killing ribes and grass simultaneously by spraying

The establishment of grass sod on prospective planting sites is unfavorable for the survival of white pine seedlings and adds to planting costs. When these areas are sprayed with 2,4,5-T for the control of ribes, both ribes and grass can be treated simultaneously by including a grass killer such as Chloro IPC (isopropyl-N-(3-chlorophenyl) carbamate). Chloro IPC applied at the rate of 20 pounds per acre in combination with the conventional aqueous spray of 2,4,5-T was effective in killing both. Specific instructions should be obtained before attempting the dual treatment of ribes and grass.

### Good results are obtained in spraying brush along roads with an aqueous solution 2,4,5-T containing stove oil.

Low volume spraying of brush along roads requires that a maximum amount of spray stick and spread on foliage of brush. This can be accomplished best by adding three to five gallons of stove oil to each 100 gallons of water. Three gallons of oil usually are enough for brush, but to limb or kill conifers, add five gallons of stove oil to 100 gallons of water. See page one for method of emulsifying oil in water.



# RESULTS OF CHEMICAL TESTS IN 1953

## 1. Spray tests after first killing frost

Methods. Ribes one foot and higher or containing one foot and more live stem were crown drenched. Stems and winter buds were wet by applying spray broadcast to the plot areas.

Location. Coeur d'Alene National Forest.

### Mature ribes plot results.

<u>Solutions</u>	<u>Date</u>	<u>Percent Ribes Killed</u>	
		<u>R. vis.</u>	<u>R. lac.</u>
Ridge-top West Fork Hudlow Creek plots: (1/20-acre size)			
2,000 ppm a.e. 2,4,5-T	9/4	81	73
+ 1% summer oil emulsion	9/15	91	59
	9/29	87	75
2,000 ppm a.e. 2,4,5-T	9/4	100	96
+ 10% stove oil	9/15	94	91
	9/29	100	96
Low-altitude Iron Creek plots: (1/20-acre size) (bordering stream type)			
2,000 ppm a.e. 2,4,5-T	9/4	-	88
+ 1% summer oil emulsion	9/15	-	83
	9/29	-	71
2,000 ppm a.e. 2,4,5-T	9/4	-	100
+ 10% stove oil	9/15	-	94
	9/29	-	96

Conclusions. Stove oil facilitates penetration of 2,4,5-T in late season when absorption of chemical by defoliating ribes is dependent upon roots, stems, and winter buds. Spray is effective on ribes regardless of the degree defoliation after first killing frost. Important that all crown centers are liberally drenched with spray without exposing roots.



### Seedling ribes plot results.

Location. South Fork Potter Creek plots (1/10-acre size).

Solution. 2,000 ppm a.e. 2,4,5-T / 10% stove oil in water.

<u>Spray Method</u>	<u>Date</u>	<u>Percent Ribes Killed</u>	
		<u>R. vis.</u>	<u>R. lac.</u>
Ribes one foot and higher or one foot and more live stem - crown drenched	10/14	-	100
All ribes regardless of size - crown drenched	10/14	-	91
Ribes of all sizes found without careful search - crown drenched	10/14	99	100

Conclusions. Ideal time to spray seedling ribes on broadcast burns is after frost kills herbaceous vegetation. Crown drench seedling ribes that are six inches and higher. Wet stems and winter buds by applying spray broadcast to the area.

### 2. Tests on effectiveness of varying volumes and concentrations of 2,4,5-T solutions

Methods. All ribes were crown drenched. Stems, leaves, and growing tips were wet by spraying each plant. Remainder of spray solution was applied broadcast to plot area.

Location. St. Joe National Forest (Ribes viscosissimum plots) and Coeur d'Alene National Forest (R. lacustre plots).

### Mature ribes plot results. (1-milacre size)

<u>Date</u>	<u>Gallons per Milacre</u>	<u>Conc. 2,4,5-T ppm a.e.</u>	<u>Percent Ribes Killed</u>	
			<u>R. vis.</u>	<u>R. lac.</u>
6/11	1½	2,000	100	-
6/11	2	1,500	100	-
6/11	3	1,000	100	-
6/11	6	500	100	-
7/1	1½	2,000	-	100
7/1	2	1,500	-	100
7/1	3	1,000	-	100
7/1	6	500	-	100
8/10	1½	2,000	-	82
8/10	2	1,500	-	85
8/10	3	1,000	-	100
8/10	6	500	-	100

Conclusions. After midsummer when soil moisture is low and ribes have fruited, more spray volume should be used to drench crowns and wet foliage. The higher volume of spray will insure a maximum amount of acid absorbed during the short interval chemical solution is available to ribes.

### 3. Tests of isooctyl ester 2,4,5-T on ribes

Methods. All ribes were crown drenched. Foliage was wet by spraying individual plants. Spray in excess of that needed to drench crowns and wet foliage was applied broadcast to plots. Volume of spray was  $1\frac{1}{2}$  gallons per milacre plot.

Location. St. Joe National Forest (R. viscosissimum plots) and Coeur d'Alene National Forest (R. lacustre plots).

#### Mature ribes plot results.

<u>Date</u>	<u>Conc. 2,4,5-T ppm a.e.</u>	<u>Percent Ribes Killed</u>	
		<u>R. vis.</u>	<u>R. lac.</u>
6/11	1,000	100	-
6/11	2,000	100	-
7/6	1,000	-	77
7/6	2,000	-	91
8/11	1,000	-	89
8/11	2,000	-	100

Conclusions. Isooctyl ester of 2,4,5-T is equally effective on ribes as the butoxyethanol ester and the propylene glycol butyl ether ester of 2,4,5-T.

### 4. Maleic hydrazide (sprout inhibitor) in 2,4,5-T spray

Methods. All ribes were crown drenched. Stems, leaves, and growing tips were wet by spraying each plant. Spray remaining after treatment of individual bushes was applied broadcast to plots. Volume of aqueous spray of 2,4,5-T was  $1\frac{1}{2}$  gallons per milacre plot.

Location: St. Joe National Forest (R. viscosissimum plots) and Coeur d'Alene National Forest (R. lacustre plots).

Mature ribes plot results.

Date	Concentration		Percent Ribes Killed	
	2,4,5-T ppm a.e.	MH ppm a.e.	R. vis.	R. lac.
6/12	1,000	-	100	-
6/12	1,000	250	100	-
6/12	1,000	500	100	-
6/12	1,000	750	100	-
6/12	1,000	1,000	100	-
7/6	1,000	-	-	92
7/6	1,000	250	-	89
7/6	1,000	500	-	82
7/6	1,000	750	-	85
7/6	1,000	1,000	-	46
8/11	1,000	-	-	100
8/11	1,000	250	-	64
8/11	1,000	500	-	46

Conclusions.— Maleic hydrazide is not compatible with 2,4,5-T in spray applied to R. lacustre. With 2,4,5-T it failed to inhibit sprouting of this ribes species.

5. Tests of new herbicides on ribes

Chemicals. PMU (phenyl dimethyl urea), CMU (chlorophenyl dimethyl urea), 2,5-D, and 3,4-D.

Methods. PMU, 2,5-D, and 3,4-D were separately applied in aqueous solution as foliage spray. CMU in powder and in pellet form was applied to soil around the base of ribes plants.

Location. St. Joe National Forest (R. viscosissimum plots) and Coeur d'Alene National Forest (R. lacustre plots).

Mature ribes plot results.

Chemical	Date	PPM	Percent Ribes Killed	
			R. vis.	R. lac.
PMU - spray	6/11	1,000	25	-
	6/11	2,000	57	-
	6/11	3,000	58	-
	6/11	4,000	78	-
	7/1	1,000	-	0
	7/1	2,000	-	0
	7/1	3,000	-	0
	7/1	4,000	-	0



Mature ribes plot results (Continued)

<u>Chemical</u>	<u>Date</u>	<u>PPM</u>	<u>Percent Ribes Killed</u>	
			<u>R. vis.</u>	<u>R. lac.</u>
PMU - spray	8/10	1,000	-	0
	8/10	2,000	-	0
	8/10	3,000	-	0
	8/10	4,000	-	0
2,5-D - spray	7/2	2,000	-	0
3,4-D - spray	7/2	2,000	-	0
CMU - powder pellet	6/18	32 lb./acre	-	43
	6/18	32 lb./acre	-	0

Conclusion. New herbicides tested in 1953 were ineffective on major ribes species in the western white pine region.

6. Killing ribes and grass simultaneously with spray

Methods. All ribes were crown drenched. Foliage was wet by spraying individual plants. Chemical solution left after spraying ribes was applied broadcast to wet grass in plots. Volume of spray was two gallons per milacre plot.

Location. Coeur d'Alene National Forest.

Solution. Aqueous spray of Chloro IPC (isopropyl-N-(3-chlorophenyl) carbamate) containing one percent summer oil emulsion was applied separately, then in combination with 2,4,5-T.

Mature ribes plot results.

<u>Date</u>	<u>Spray Solution</u>		<u>Percent Kill</u>	
	<u>2,4,5-T</u> <u>ppm a.e.</u>	<u>Chloro IPC</u> <u>lbs./acre</u>	<u>R. lac.</u>	<u>Grass 1/</u>
9/3	-	10	0	75
	-	20	0	90
	-	30	0	100
	-	40	0	100
	2,000	-	100	0
	2,000	10	100	60
	2,000	20	100	95
	2,000	30	100	100
	2,000	40	100	100

1/ Major grass species: Canada blue (*Poa compressa* L.), Redtop (*Agrostis alba* L.), Quack (*Agropyron repens* Beauv.), and Timothy (*Phleum pratense* L.)



Conclusion. Ribes and grass are killed satisfactorily by applying together in aqueous solution Chloro IPC at 20 lbs./acre and 2,4,5-T at 2,000 ppm a.e. Chloro IPC is a soil sterilant thus a high volume of spray must be applied to carry chemical into the soil.

#### CHEMICAL TESTS IN 1954

##### Silvex - 2(2,4,5-trichlorophenoxy) propionic acid

Silvex, a systemic brush killer, is a new addition to the group of substituted phenoxyaliphatic acids. Plant response to this growth regulator differs from 2,4,5-T as follows: Its action on ribes is slower. Visible leaf responses are delayed five to 10 days. Stems usually remain green for a longer period and ribes do not manifest leaf modifications. Plants sprayed with silvex will, however, show epinastic response in the stems and petioles.

Two formulations of silvex were supplied by the trade for testing on ribes. One was an emulsifiable formulation containing mixed propylene glycol butyl ether esters of silvex. The other was an amine salt formulation. These two formulations were compared in tests with 2,4,5-T over a wide range of concentrations, spray volumes, and methods of application. Plots were established and treatments replicated throughout the field season in the St. Joe and Clearwater National Forests. Large plots were employed so that solution could be applied with a portable power sprayer. Based on trade information that silvex is more easily translocated by woody plants than 2,4,5-T, tests were made applying solution broadcast as a foliage spray without crown drenching ribes. There was some indication this season that silvex applied as a foliage spray to seedling ribes might be more satisfactory than 2,4,5-T.

##### TCA (trichloroacetic acid)

This herbicide is being tested in combination with 2,4,5-T for spraying ribes after ripening of fruits. Since TCA kills by being absorbed from the soil, any assistance to 2,4,5-T from late season treatments depends on TCA being absorbed by ribes during the fall, winter, and early spring months. A 90 percent sodium salt of TCA was furnished by the trade to test on ribes.

##### Dalapon - 2,2-dichloropropionic acid

Dalapon is a systemic herbicide of recent development for the control of grass. It differs from other grass killers in that it is absorbed by the foliage and translocated to all parts of the plant. A 78 percent sodium salt containing an anionic wetting agent was furnished for experimental tests by the Dow Chemical Company.

A camp clearing in Kalispell Creek drainage, Kaniksu National Forest, was chosen as a site to test Dalapon. This area is heavily sodded and contains the principal grass species found on broadcast burns. Plots were



1/10 acre in size, 1 x 1 chain square. Dalapon was applied in aqueous solution at rates of 4, 8, 12, 16, and 20 pounds per acre. Two series of plots were sprayed, one during the period of most active plant growth, June 14 and 15, the other on July 20 and 21 during the interval between the heading and ripening of grass.

Species and density of grass and other plants in the plots were determined by recording these data every 1.32 feet across the plots along two permanently marked check lines. The sprayed plots and untreated checks will be planted to 100 white pine each in 1955. This is being done to determine the relationship between the survival and growth of white pine and competition from grass following spray treatment.

#### Water-stove oil emulsions of 2,4,5-T

In 1953 an aqueous spray of 2,4,5-T containing 10 percent stove oil was found highly satisfactory for spraying ribes after date of first killing frost. In 1954, tests were made to lower the percentage of stove oil in the spray by improving the methods of emulsifying stove oil in water. Heretofore, with the facilities available, water has been added under pressure to the mixture of stove oil and 2,4,5-T. Stove oil mixed in water this way tends to separate unless spray is under constant agitation. With the development this year of an injector operated off the power sprayers, the mixture of stove oil and 2,4,5-T can be broken into small particle size and added to water. This operation is best performed while the sprayer tank is being filled with water. Using the injector to add the mixture of stove oil and 2,4,5-T to water, the percent stove oil can be lowered to approximately five percent. The water-stove oil spray should consist of five gallons stove oil for each 100 gallons of water.

#### STATUS OF RIBES ECOLOGY STUDIES

##### Occurrence of ribes seedlings following initial spray treatment

Seedling ribes are germinating on partial cuttings when initial spray treatment is performed within three to five years following logging. Most of these seedlings are originating from disturbances caused by opening roads to make the areas accessible to power spray equipment. A few are germinating from disturbances caused mostly by burrowing rodents and a few from the change in microclimate of the soil brought about by killing densely populated ribes and other brush.

The seedling problem can be somewhat alleviated by more careful planning of the spray operation to open fewer roads. Thus far, no definite factors have been found to explain why soil disturbances will cause seedlings to germinate on some sprayed areas and not others which were heavily populated with ribes bushes. It is fairly conclusive that in most partial cuttings a second working following initial spraying will be required because of the occurrence of ribes seedlings. Second working should not be undertaken until the second year after spraying to provide enough time for all ribes seed to germinate.



Prescribed controlled burns have not been found, so far, to have ribes seedlings germinating after initial spray treatment. Ribes seedling germination usually ends the third year following burning except where heavy populations of mature ribes deposited new seed before burning and the burning was light. The ideal time to spray broadcast burns is the third year after burning. By then all ribes seeds are germinated and no new seed has been deposited. More to facilitate planting, one prescribed controlled burn was sprayed in 1954 two years after burning. This area will be closely observed to see whether spraying was a year too early.

#### Timing of ribes eradication on cutover lands

Prescribed controlled burns should be sprayed or hand eradicated of ribes the third year following burning. The practice of working these areas the second year after burning, for the next year or two, should be confined to small experimental jobs.

In partial cuttings, the proper time for spraying or hand eradicating ribes is three to four years following logging. After four years, one can expect to have trouble from seedling ribes of new seed origin if the areas are hand eradicated of bushes. It is not presently known how these areas will react to chemical spray treatment except that seedlings from new seed deposits are very likely to occur following any major soil disturbance. Results of studies on the occurrence of ribes seedlings following initial spray treatment five or more years after partial cutting will be reported in 1955. These areas were sprayed five to 15 years after cutting and have accumulated deposits of new seed.

It is not advisable in partial cuttings or prescribed controlled burns to perform second working until two or three years after first working. If ribes seeds are to germinate or if root crowns are to sprout, this will occur within two or three years after first working.

#### Timber cutting practices

Partial cutting, if administered properly, can contribute considerably to the eventual elimination of ribes on an area by suppression of ribes seedlings and more important by the dissipation of stored ribes seed through germination and devitalization of such seed. Unfortunately, all partial cuttings are not successful in this respect by reason of being too light or too heavy to accomplish the desired results.

The length of time between the disturbances caused by first cutting and second cutting of white pine is the important factor in minimizing the ribes control problem after second cutting. Ribes seeds not germinating from the first soil disturbance in partial cutting are eventually devitalized by the change in microclimate of the forest floor after logging. The period of years required to devitalize ribes seeds depends upon density of residual canopy in relation to alterations of soil moisture and temperature. When 60 percent or more of the total board-foot volume of a white pine stand is removed by partial cutting and the residual stand is not cut until 10 to 12 years later, such areas are showing only occasional ribes germinating in moist habitats as a result of



the second cut. When less than 50 percent of the total board-foot volume is removed by first cutting, then second cutting of the residual stand should be postponed about 20 years; otherwise, the areas would contain varying amounts of viable ribes seeds to germinate from an earlier disturbance of logging and slash disposal.

#### Ribes regeneration following dozer-piling of logging slash

In the Clearwater and Kaniksu National Forests the effect of dozer-piling of logging slash and burning upon ribes regeneration is being observed. The ground is heavily scarified to expose mineral soil as a favorable seedbed for white pine and cedar. Other tree species are being felled by chain saw or knocked down by dozer to eliminate the possibility of low value species seeding the areas.



UNITED STATES DEPARTMENT OF AGRICULTURE

Forest Service

Region One

BR  
REPORTS  
Annual - 1954

DEVELOPMENT AND IMPROVEMENT UNIT

Rust Resistant Pine  
Maintenance Area Plot

Prepared by: R. T. Bingham

Approved: January 10, 1955  
H. E. Swanson  
Assistant Regional Forester





## DEVELOPMENT OF RUST RESISTANT WHITE PINE, 1954

Major projects in rust resistant white pine breeding undertaken during 1954, together with some preliminary results of resistance testing, are presented below. Mr. A. E. Squillace of the Intermountain Forest and Range Experiment Station cooperated in most of the work outlined.

### 1. Vegetative propagation of western white pine

In an attempt to get all 72 of our rust resistant white pine selections in graft and forestall possible loss of valuable germ plasm, some 1,550 bottle grafts (20 to 40 of each selection) were made between June 1 and July 15. Despite the use of what have been the best grafting techniques developed over five years of grafting work, overall success was only about 40 percent. Depending on the selection grafted success ranged from 0 to 100 percent. There appears to be some heritable barrier to successful grafting of certain selections, observed in repeated trials here and by cooperating personnel at other stations. Only six selections now remain to be grafted, all from the Quartz Creek selection area on the Kaniksu National Forest, but more grafts of about one-third of the selections are needed to fulfill graft outplanting needs.

Flower induction work begun in 1953 while not highly successful will be of considerable help in planning future work. Apparently top-working young scions onto more mature trees is possible and the use of scion material which characteristically grafts well should produce satisfactory results. A few intergeneric grafts (Pinus monticola scions on Pseudotsuga taxifolia stocks) survive but scion growth is retarded. A good degree of success was obtained grafting young P. monticola scions on P. strobus rootstocks, or on P. monticola x P. strobus hybrid rootstocks. These and several other methods will be used in an expanded program of flower induction work to be started in 1955.

### 2. Controlled pollinations

Six pollinations on two different resistant tree selections were made as an experiment in selective fertilization to try to determine the efficacy of self-pollen when in competition with pollen from other white pine trees. The information would be of use in later seed orchard work. Also, six hybrid pollinations were made in 1954. Further work in making first-generation crosses among resistant selections now awaits the results of resistance testing among some 250 F<sub>1</sub> progenies produced in pollinations made in the years 1950 through 1953.

### 3. First lot of controlled pollinated progenies transplanted to the field

Ninety-nine seedling progenies from controlled and wind pollinations of 1950 were outplanted as 2-0 nursery stock on three resistance test plots prepared in 1953. Transplanting loss was negligible, amounting to about 20 out of 7,500 transplants. Apparently the method of sowing and transplanting in individual plant bands is successful in reducing transplanting losses.



#### 4. Preliminary rust resistance heritability data encouraging

The first symptoms of blister rust infection (bright yellow needle spots or bands, often with brown centers) began appearing on the 99 outplanted progenies about June 1. Since the inoculations were made about October 1, 1953, the needle spot infections became visible after about an 8-month incubation period. The presence of blister rust mycelium in typical needle spots was verified microscopically for spots on each of five different progenies examined.

Data were recorded upon two features of the needle spotting as follows: (1) the number of seedlings in each progeny having one or more needle spots (progeny percent of infection), and (2) the relative number of individual infection foci (spots) occurring on a foliage sample of 450 needles in each progeny. Preliminary results based upon these examinations as shown in the following tabular summary must be considered in the light of the possibility that needle spots may not prove to be a reliable index of cankering to follow. It is possible that visible needle spot infections may not reach the bark or that invisible needle infections may be present. Determination of the reliability of needle spots for predicting future cankering must await the appearance of the bulk of the cankers, probably by late summer, 1955. Percent of progeny seedlings infected and number of infections per 450-needle sample is arrayed for 20 different parent selections which had been crossed with one or more of five test trees. These test trees were heavy fruiteders used for crossing with all other possible selections. Their use makes results more comparable but eliminates from the table individual results for some 26 progenies produced in controlled crosses not involving test trees as a parent. Results for these progenies are averaged with the test tree results and shown in the all cross average columns at the right of the table.

It is evident from the table that the average test tree progeny contains a large proportion of susceptible seedlings. It is also evident that a few of the 20 parents rather consistently transmit resistance, in a degree both encouraging and useful for channeling future breeding work. Thus crosses of selections 21, 58, 17, 19, and possibly 24 exhibit lower than average percentages of infection and numbers of infections per 450-needle sample. An examination of infection on progenies produced by mating two of these five promising parents is even more encouraging since apparent resistance is even greater when compared with average test tree cross.



APPARENT TRANSMISSION OF BLISTER RUST RESISTANCE BY 20 SELECTIONS USED EITHER AS SEED OR POLLEN PARENTS  
IN 52 CONTROLLED POLLINATED TEST TREE CROSSES MADE IN 1950

(Basic data, 1954 inspections of 29- to 72-tree progenies showing percent of seedlings in the various progenies having one or more typical blister rust needle spot infection, and number of such typical spots in a 450-needle sample of the foliage of seedlings of the various progenies.)

Parent Number	Test Tree Number										Test Tree				All Cross	
	19		20		25		30		58		CROSS AVERAGE		No.		Average	
	% Inf.	No. Infs.	% Inf.	No. Infs.	% Inf.	No. Infs.	% Inf.	No. Infs.	% Inf.	No. Infs.	% Inf.	No. Infs.	% Inf.	No. Infs.	% Inf.	No. Infs.
1	74.5	116	85.5	163			86.2	173	X	X	82.1	150.7		7	83.3	170.1
10	80.6	256	82.8	231	85.9	202			X	X	83.1	229.7		3	83.1	229.7
15	X 1/	X	X	X	83.3	155	79.0	118	X	X	81.1	136.5		4	80.7	130.2
16	81.0	178	55.8	277	94.4	239	77.5	217		232	80.0	228.6		9	80.0	219.3
17	85.5	178	X	X	77.9	132	82.0	216		53	81.3	144.7		9	74.8	123.1
18	82.4	173	X	X	84.5	148	87.5	209		77	84.1	151.7		5	84.6	172.0
19	87.5	131	91.2	276	X	X	93.9	402		77	87.2	221.5		17	81.6	185.9
20	91.2	276	X	X	X	X	78.8	260		X	85.0	268.0		10	80.8	240.2
21	46.9	37	X	X	70.4	101	83.9	137		77	65.8	88.0		8	63.7	110.2
22	81.9	163	96.7	350	91.5	233	87.1	262		154	89.5	232.4		9	87.4	237.2
24	82.4	101	65.1	176						148	72.1	141.7		5	73.2	160.1
25	X	X	X	X			86.9	162		77	82.7	119.5		11	83.4	169.0
27	X	X	90.1	235						X	90.1	235.0		2	85.8	320.5
28	79.2	131								X	79.2	131.0		2	76.9	121.5
29	92.3	250	X	X			X	X		90	86.4	170.0		4	86.4	190.5
30	93.9	402	78.8	260	86.9	162				245	86.3	267.2		15	85.3	214.3
37	X	X	X	X			90.7	205		133	80.7	169.0		4	79.5	150.5
38	78.3	249	X	X							78.3	249.0		1	78.3	249.0
39	93.9	190	86.4	251			89.7	359		269	88.2	267.2		6	83.9	266.7
58	76.4	77	X	X	78.6	77	85.7	245		152	82.3	137.7		14	80.2	137.9
Averages	81.7	181.7	81.4	246.6	83.7	161.0	85.3	228.1	79.8	137.2	82.4	187.0			80.6	189.9

1/ Test tree cross made 1951 through 1953 and not available for testing until 1955 through 1957.

Eight such matings made in 1950 pollinations are shown in the tabulation below.

TRANSMISSION OF RESISTANCE IN CROSSES WHEREIN BOTH PARENTS ARE ABOVE  
AVERAGE IN TRANSMITTING RESISTANCE

Cross	Number Seedlings	Percent Infected	Percent Below Average	Relative No. Spots	Percent Below Average
19x17	69	85	Above average	178	5
19x21	49	47	43	37	80
19x24	34	82	0	101	46
19x58	72	76	7	77	59
21x17	69	55	33	57	70
58x17	69	80	2	53	72
58x21	71	62	24	77	59
58x24	67	69	16	148	21
Test Tree					
Cross Avg. -		82	-	187	-

Realizing the tentative nature of this information no attempt has been made to determine ratios of inheritance of the resistance factor for various parents. It has been decided, however, that retesting of promising crosses is of primary importance, perhaps, under conditions of both natural and artificial inoculation. Also, that selections like 16, 20, 22, 30, and 39, which bred a high number of susceptible progenies, can be excluded from most future breeding work. A concerted effort toward hastening flowering in promising progenies like 21 x 17, possibly shortening the time before backcrossing and other second generation breeding can be started, must be considered first priority work from this time forward.

INFILTRATION OF BLISTER RUST ON MAINTENANCE AREAS

The large area near Elk River, Idaho, under study to determine development of rust on maintenance areas, was partly examined during 1954. Along with maintenance of plot markers, a 20 percent subsample of the 1,245 sample white pines at 249 sampling stations was examined for rust. No appreciable amount of rust of origin postdating plot establishment (rust of 1952 and 1953 origin) was found. Rust of 1950 and 1951 origin, most of which postdates establishment of maintenance status, was found in intensity sufficient to make it worthwhile to examine the entire plot in 1955.



# **BLISTER RUST CONTROL IN CALIFORNIA**

**A COOPERATIVE PROJECT  
OF  
STATE & FEDERAL AGENCIES  
AND  
PRIVATE OWNERS**

**ANNUAL REPORT  
1954**

**U. S. DEPARTMENT OF AGRICULTURE  
FOREST SERVICE**





ANNUAL REPORT  
ON  
THE CONTROL OF WHITE PINE BLISTER RUST  
IN CALIFORNIA  
FOR THE  
CALENDAR YEAR 1954

HIGHLIGHTS OF 1954 - By T. H. Harris, Chief, BRC Unit

PROGRAM REPORTS - By Benton Howard, Assistant Chief, BRC Unit

METHODS DEVELOPMENT - By H. R. Offord, Chief, MD Unit

U. S. DEPARTMENT OF AGRICULTURE  
FOREST SERVICE  
CALIFORNIA REGION  
1954







W-849. A young sugar pine infected with blister rust. The large bole-canker will soon kill this tree.







## CONTENTS

### CONTROL PROGRAM

Highlights of 1954 . . . . .	1-7
Direction of the Program. . . . .	8-13
Work on State and Private Lands . . . . .	14-17
The National Park Project . . . . .	18-21
The National Forest Project . . . . .	22-24
Tables . . . . .	25

### METHODS DEVELOPMENT PROGRAM

Highlights of 1954 . . . . .	26-30
Ribes Ecology in California and Oregon, 1954 . . . . .	31-35
Further Development of Methods for Chemical Control of Ribes . . . . .	36-40
Disease Studies in California and Oregon . . . . .	41-48





White pine blister rust is a forest tree disease caused by a fungus (Cronartium ribicola, Fischer) introduced into North America from Europe about 1900. The disease is widespread throughout northern California where it is killing native white pines. The continued production of white pine timber on most sites in California is not possible without control of blister rust. The problem, then, is the protection of commercial and recreational stands of white pine, a task accomplished through the destruction of the carrier host plants of the fungus, currants and gooseberries (collectively called ribes), growing in the stands.

The immediate objectives of the control program are (1) the protection of selected stands in areas now being exposed to rust damage through the removal of endangering ribes populations, (2) the protection of selected stands in areas where blister rust is not yet present through the suppression of ribes populations on an ecologically timed schedule. The ultimate objective is the production of crops of white pine and the protection of recreational stands through the permanent suppression of ribes.

Sugar pine, most important commercially of California's white pines, is the largest of the world's pines. Recent forest survey findings indicate an inventory of some 27.4 billion board feet of commercial sugar pine now standing in the forests of California. A conservative average market value for sugar pine stumpage is now about \$30 per thousand board feet. Commercial sugar pine standing timber is, therefore, worth about \$822,000,000. Within the national parks of the State there is another 2.3 billion board feet of sugar pine and other white pines, which have indefinable but large recreational value. Exclusive of mature stands, existing immature growth will produce at maturity an estimated 13 billion board feet worth \$390,000,000. Most of the mature growth may be harvested before it is destroyed by blister rust. The real threat from blister rust damage and destruction is to the present immature stands and to future generations of white pine reproduction.

SUGAR PINE AN ASSET OF  
HIGH ECONOMIC AND  
AESTHETIC VALUE

Sugar pine produces a superior wood prized for its ease of working, straight grain, and shape-holding qualities. Used for foundry patterns, mill work, mouldings, carvings, and exterior work, it is a premium, specialty-use wood. In the white pine markets of the nation the species fills a recognized economic need.

REORGANIZATION ORDER  
PLACES BRC WORK IN THE  
FOREST SERVICE

On January 1, 1954, in a move that was part of the general reorganization of the U. S. Department of Agriculture, blister rust control work was transferred from the

Bureau of Entomology and Plant Quarantine to the Forest Service. There, in the Washington, D. C. office, the project was set up as the Division of Blister Rust Control in the Branch of State and Private Forestry. The work in the California region of the Forest Service (Region 5) is handled by the Blister Rust Control Unit, a separate division responsible to the Regional Forester.

COOPERATION THE KEYNOTE  
IN ACHIEVING PROGRAM GOALS

The Forest Service of Region 5, through its BRC Unit, is furnishing leadership, technical direction, and coordination to the entire control program in

California. This responsibility entails cooperation with private owners, the State of California, and the National Park Service. The BRC Unit in cooperation with the Division of Timber Management administered the work on national forest land, and in cooperation with the National Park Service it gave technical leadership to important control projects in Yosemite and Sequoia-Kings Canyon National Parks.

The protection of sugar pine stands in private and state ownership in California from blister rust is a cooperative undertaking of the State of California, the private owners, and the Federal Government. California, through an appropriation of \$125,000 for fiscal year 1955, again became the principal financial supporter of the work on these lands. A new cooperative agreement between the Division of Forestry of the State of California and the Forest Service providing for new cooperative relationships was negotiated. Private timberland owners contributed a total of \$5,350 under cooperative agreements.

Since some type of formal request from owners for control work is now considered necessary to the expenditure of State or Federal funds on private land, the cooperative project was explained to a large percentage of the principal landowners in control areas and their participation solicited. As a result simple statements of understanding expressing interest in the management of the sugar pine crop and a desire for its protection from blister rust were signed with 14 timberland owners. Agreement on control has not yet been reached with some owners.



Blister rust control areas in California now total 618,000 acres: 152,000 in national parks and 466,000 in commercial stands.

The latter are divided into 227,000

acres privately owned, 8,000 State owned, and 231,000 acres of national forest land.

PROGRESS IN CONTROL  
WORK REPORTED

Ribes have been removed once (initial eradication) from 81% of the 618,000 acres. Twenty-five per cent is on maintenance, a condition in which ribes suppression is maintained through a small amount of periodic work.

Sugar pine delineation surveys, which have been in progress since 1949, apply economic factors as developed by Professor Henry J. Vaux\* to the selection of sugar pine stands for management. For all practical purposes these surveys were completed in the 1954 season. The 466,000 acres of commercial sugar pine now selected for management, however, is by no means a static figure nor does it necessarily represent the optimum size of area economically. The productivity of this area in terms of future sugar pine yield, the time distribution of that yield, the ownership pattern, and similar factors must still be appraised in terms of Professor Vaux's analysis of the second-growth sugar pine resource and the place of the species in our future economy. After such an appraisal it may appear advisable to set a goal for future sugar pine production and hence for the acreage devoted to growth of the species.

How much control work remains to be done on the present control area for commercial stands, totaling 466,000 acres? Rough estimates given in the following table have been prepared to show this.

REMAINING CONTROL WORK  
ESTIMATED

---

\* "The Economics of the Young-Growth Sugar Pine Resource" by Henry J. Vaux, California Agricultural Experiment Station, College of Agriculture, University of California, Berkeley, January 1954.

ESTIMATED COST OF COMPLETING RIBES ERADICATION  
ON SUGAR PINE MANAGEMENT AREAS IN CALIFORNIA

Ownership	Item	Average Annual Acreage Worked And Cost Per 5-Year Period					Total Cost To Maintenance
		1955-59	1960-64	1965-69	1970-74	1975-79	
Private and State Lands 235,000 Acres	Acres	16,000	12,000	9,000	6,000	4,500	\$3,205,000
	Dollars	\$167,000	\$141,000	\$127,000	\$108,000	\$ 98,000	
National Forest Lands 231,000 Acres	Acres	18,000	16,500	12,500	8,000	5,000	\$3,970,000
	Dollars	\$212,000	\$200,000	\$153,000	\$121,000	\$108,000	
All Commercial Stands 466,000 Acres	Acres	34,000	28,500	21,500	14,000	9,500	\$7,175,000
	Dollars	\$379,000	\$341,000	\$280,000	\$229,000	\$206,000	

After 1979 about \$100,000 a year will be required to maintain control on these lands. This charge will decrease with time. The above estimates are based on 1954 costs.

Initial ribes removal on the 152,000 acres of control area in Yosemite and Sequoia-Kings Canyon National Parks will be completed at the present rate of progress by 1957 or 1958, and 85% of the area will be on maintenance by about 1963.

If the uncut stands are logged within 25 years and the present level of operations is maintained or adjusted to meeting changing needs, suppression of ribes in the commercial stands will be achieved within the next 25 or 30 years, and most of the acreage will then be in a maintenance condition. In 1954 fifteen per cent of the total acreage requiring initial work was treated. Although at this rate the initial ribes eradication would be completed in seven years, this is not a true gauge of the rate of completion of the whole job. Logging and other ground disturbances start new cycles of ribes regeneration, which must be suppressed by properly spaced eradications. The rate and timing of logging in uncut stands and of relogging on cut-over lands, therefore, largely determine the amount of control work needed in any period, and since these factors cannot be known precisely or even approximately in most cases, it becomes very difficult to forecast with any accuracy when much of the control work will fall due. Estimates only are possible.

Five million ribes were destroyed on 46,000 acres during the season of 1954, of which 17,000 acres was initial treatment and 29,000 acres was second and subsequent treat-

ments. Thirty-four thousand acres or 73% was handled under contract at an average price per acre of \$7.25. Almost 700 acres were treated with chemicals. Ribes surveys showed that an additional 22,000 acres did not require eradivative treatment at this time.

#### ACCOMPLISHMENTS IN 1954

Work plan estimates prepared in the spring of 1954 called for a coverage of 43,000 acres for the season. In spite of the loss of key field personnel and the substitution of workers untrained in control work, this goal was exceeded by 3,000 acres.

The second eradivative treatment was completed in the 10,000-acre fox-tail pine control unit in the High Sierra of Sequoia-Kings Canyon National Parks; chemicals were used extensively. Initial ribes eradication in all stands has been completed in this park. In Yosemite Park 1,230 acres were handled under the contract procedure.

The same type of service in blister rust control work is being offered to timberland owners, State and Federal agencies under the Forest Service as was the case under the Bureau of

Entomology and Plant Quarantine. Leadership and technical direction of control projects are still available to all interested parties. In accord with the organization of the Forest Service, field work on control areas within and adjacent to the national forests is now handled by trained staff men attached to the forests. On one national forest the administration of control work by the ranger staffs is being tested for feasibility.

#### CHANGES IN ORGANIZATION AND FINANCING

There were several significant changes in financing that took place in fiscal year 1955. These are summarized in the following table.



# COMPARISON OF FUNDS AVAILABLE FOR BLISTER RUST CONTROL IN CALIFORNIA IN FISCAL YEARS 1954 AND 1955

Fiscal Year	State of California	Private Owners	Federal Allotments For				Totals
			State and Private Lands	National Forest Land	Technical Direction	National Park Lands	
1954	\$168,000	\$3,350	\$92,330	\$325,000	\$94,450	\$259,500	\$942,630
1955	\$125,000	\$5,350	\$40,000	\$279,000	\$88,000	\$197,170	\$734,520

The principal cut in Federal funds was a 50% reduction nationally in those for work on private and state lands. This action reflected the belief by Congress that the states and private owners should finance a larger part of this work. Orderly progress toward control on national forest land and in the national parks in California made possible reductions in these allotments as shown in the table. The State of California's appropriation, fiscal year 1955, requires matching with funds from private and Federal sources. (Previously private and state funds were matched with Federal.) When it became apparent that these sources would yield considerably less in matching funds in fiscal year 1955 because of the large cut in Federal money, California reduced its appropriation proportionally.

## DISTRIBUTION OF THE RUST SHOWS ONLY MINOR CHANGES

Again in 1954 blister rust did not spread long distances from white pines to the alternate hosts, ribes, in California. Apparently conditions were unfavorable for widespread

rust dissemination. The disease, however, is continuing to intensify generally in the northern part of the State, where it is now epidemic in many places. Several new rust infections were discovered.

## CALIFORNIA REDEFINES POLICIES ON BLISTER RUST CONTROL

The California State Board of Forestry on March 12 adopted a blister rust control policy, the chief provisions of which are (1) that the State will assume the full cost of

control on State land, and (2) that the State ratio of expenditures to other cooperators for the protection of privately owned land shall not exceed 50% of total costs. The State Forester held a public hearing in August

to discuss the interests of private timberland owners and of the public in the control program on private lands and to help clarify future State policy. The State will reconsider its blister rust policy before June 30, 1955.

The following recommendations cover the principal fields in which improvement is needed:

RECOMMENDATIONS
-----------------

1. Continue to interest private owners in establishing firm policies in the management of sugar pine with the immediate objective of integrating blister rust control with other forest management practices.
2. Public agencies responsible for forest management should accelerate research on the silviculture of sugar pine.
3. Encourage progress in practical sugar pine management by Federal and State agencies.
4. Develop cheaper means of control and methods of applying control; procedures for inspection and treatment of maintenance areas should be improved.
5. Implement a comprehensive research program in California to obtain facts on rust behavior under varying climatic conditions.
6. State and Federal policy regarding responsibility for control of blister rust on private lands should be further clarified.







B-53. Mature sugar pine on Chowchilla Mountain in the Sierra National Forest where some of the best sugar pine growing sites in the State are to be found.





## DIRECTION OF THE PROGRAM

The control of white pine blister rust in California is the cooperative undertaking of the State of California, the timberland owners, the National Park Service, and the U. S. Forest Service. Each Federal agency conducts the control work on lands under its jurisdiction. The State of California appropriates a substantial sum annually for work on state and private lands, and several timber owners contribute funds for work on their lands. Project work on state and private lands is directed by the Forest Service under cooperative agreements with the State of California and private owners.

The Secretary of Agriculture is authorized by the Lea Act of 1940 to control white pine blister rust on all forest lands regardless of ownership. However, at the Secre-

CONGRESS HAS ESTABLISHED  
AUTHORITY

tary's discretion funds shall not be expended for control work on state and private lands unless sums equal in amount to the proposed Federal expenditures are available, except where such lands are so intermingled with those in Federal ownership that control work is necessary on them to protect the white pine timber on Federal lands.

On January 1, 1954 under the terms of the Reorganization Plan No. 2 of the Department of Agriculture the Office of Blister Rust Control, Bureau of Entomology and Plant Quarantine, was transferred to the U. S. Forest Service. Therefore, Region 5, U. S. Forest Service, is now responsible for the leadership, technical direction, and coordination of the entire program for California. As part of the responsibility the Service is charged with the collection, summary, and presentation of pertinent statistical data. Accordingly it is necessary for Forest Service personnel to work closely with representatives of the several cooperating agencies particularly during the field season. The Service has executed agreements with the cooperating agencies and owners defining responsibilities.

Blister rust control work in Oregon was placed under the jurisdiction of Region 6, U. S. Forest Service, Portland, Oregon.



## BLISTER RUST CONTROL UNIT PROVIDES LEADERSHIP

cooperating agencies and with the lumber industry on policies, financing, and project planning.

Two geographical areas have been established for the technical direction and guidance of the projects. The work in each of these areas is coordinated by an assistant chief of the Blister Rust Control Unit. The northern area encompasses the northern Coast Ranges and the Sierra Nevada north of and including the Eldorado National Forest. The central area comprises the Stanislaus National Forest and the Sierra Nevada southward. Blister rust control officers and assistants assigned to forests having a control project administer the work on private, state, and national forest lands.

## EVALUATION OF SUGAR PINE AREAS FINISHED

The Blister Rust Control Unit of Region 5 takes the lead in organizing the control program in California.

The Unit chief gives direction to the program and works actively with the

task of rating the most valuable stands of sugar pines in the commercial forests of California has been completed. The principles outlined by Dr. Henry J. Vaux in his bulletin

entitled "The Economics of the Young-Growth Sugar Pine Resource" were followed in making the evaluation. The national forest lands meeting the requirements have been selected and designated as sugar pine management areas. A few scattered areas of lesser importance remain to be delineated. The sugar pine stands in Latour State Forest and the Mountain Home State Forest have been appraised. The California Division of Forestry has selected lands qualifying and has designated them as sugar pine management areas.

The best privately owned lands have been surveyed and rated under Dr. Vaux's procedure. The areas that qualify have been delineated and their status has been discussed with the owners. Those lands on which the owner wishes to perpetuate sugar pine and has expressed a desire to have blister rust control work performed have been established as blister rust control units. Some owners have not yet reached a decision as to their management policy. Discussions with them are continuing.

National forest lands in sugar pine management units are now being given special treatment that will benefit sugar pine wherever funds are available. Increasing attention is being

## SUGAR PINE MANAGEMENT

given to sugar pine areas in timber sale marking and silvicultural work. The Lassen and Stanislaus National Forests planted sugar pine to increase stocking on some small areas within the management units. Sugar pine planting techniques were also tested. The Lassen National Forest made a special sale of residual over mature timber on a sugar pine management unit. The timber was marked to give maximum benefit to the excellent young sugar pine stand. Pruning of sugar pines and release of potential crop trees are planned. On another sale the Lassen took special measures in rodent control and seedbed preparation to assist natural sugar pine regeneration. Sales of residual fir stands on old cut-over areas within the sugar pine management units are awaiting favorable market conditions on several forests. These are being designed to benefit the sugar pine stand as much as possible.

In answer to a long felt need the California Forest and Range Experiment Station in collaboration with the Forest Service Division of Timber Management, and the Blister Rust Control Unit, has begun work on an annotated bibliography of sugar pine management.

Hand eradication of ribes remains the basic procedure as a means of destroying the rust's alternate host.

## ERADICATION PROCEDURES

However, on local sites this technique is modified to conform with unusual conditions. The use of herbicidal chemicals 2, 4-D and 2, 4, 5-T is standard procedure in supplementing hand methods where feasible. In many areas the occasional large troublesome ribes are individually treated with concentrated solutions of the chemicals. On areas of dense ribes populations chemicals are used exclusively and are applied by hired crews using power equipment.

Hired labor was in general use on the national parks where extensive areas are now receiving maintenance work. These maintenance workings are achieved more readily with hired labor and are less costly than if handled under contract.

Nearly all the work on national forest, state and private lands was done by contractors using hand eradication methods. Herbicidal chemicals were used by them to supplement hand work in many instances. The



control standards for ribes eradication work were revised and adjusted to conform with needs as indicated by recent experience with rust spread and development under California conditions.

#### CHECKING STANDARDIZED

Checking is the systematic strip sampling of ribes populations on an area to determine their location, number, size, and kind. It is done prior to ribes eradication in order to

estimate costs and to plan the work. When performed after ribes eradication its purpose is to ascertain if the required standards have been met.

During the 1953 season comprehensive data were gathered on strip width, the checker's ability to find ribes, and other checking techniques. These data have been analyzed and as a result checking procedures have been revised. The relative accuracy of the checking data is now known within acceptable limits. Performance standards as to accuracy have been set for the individual checker. The data indicate that a check strip 8-1/4 feet wide is nearer optimum than any other width and has been adopted in place of the 16-1/2 feet wide strip formerly in use. A procedure of statistical evaluation of checking data involving the use of standard error expressions has been devised and put into use. A minimum intensity sample is first taken and the resulting data subjected to statistical analysis. When it is found that the sample mean, expressed in feet of ribes live stem per sample plot, is defined with insufficient precision, additional sample strips are run. In many areas a minimum check is all that is needed with a resultant saving in cost. As a result of these measures, checking data are more consistent, dependable, and accurate than before. This is borne out by the increased difficulty many contractors had in meeting the standards. Superior eradication work resulted and areas were left in better shape than in the past.

#### BLISTER RUST NOW EPIDEMIC IN PARTS OF CALIFORNIA

White pine blister rust is now epidemic in many of the sugar pine stands outside the control units north of Mt. Lassen. The disease is generally present within these stands; cankers

are becoming readily visible and many young sugar pines are now dead or dying. In many parts of the Klamath, the Shasta-Trinity, and Lassen National Forests and adjacent areas the stocking of sugar pine seedlings and saplings is being seriously reduced. The option of saving the present stocking of young sugar pines is rapidly being lost in this part of the State.



In some areas as far south as the Tahoe National Forest blister rust is spreading from the initial centers of incidence in zones of high hazard into the zones of medium rust hazard. Infected sugar pines were found in medium-hazard zones near La Porte at American House and on Mooreville Ridge on the Plumas National Forest and at Fiddle Creek near Downieville on the Tahoe National Forest.

Systemic scouting for occurrence of blister rust in high-rust-hazard zones of the Stanislaus National Forest was begun in 1953 and completed in 1954. No new infection centers were found in 1954. The three known centers on Moore Creek, Herring Creek, and Dodge Ridge were systematically examined and all cankers discovered were removed. On Herring Creek a total of 115 cankers on 76 sugar pines has been found to date. High-rust-hazard areas on the Lassen and Tahoe National Forests and in Yosemite National Park were also scouted; systematic coverage of these forests and of Yosemite will be completed in 1955 or 1956. The finding of an infected sugar pine in Lassen Volcanic National Park constituted the discovery of blister rust on pine in the park.

In 1941 ribes eradication was started in the Hungry Creek area on the Klamath National Forest. Although the initial work was completed in 1946, the desired control standards were not

RIBES ERADICATION HAS CONTROLLED BLISTER RUST
--

reached on much of the area until 1948. White pine blister rust entered the area in 1938. Prior to reaching a satisfactory level of ribes suppression, severe waves of blister rust infection occurred in 1941 and 1942 when weather conditions were favorable. During 1954 a detailed disease survey was made to determine the amount of blister rust infection on the sugar pine crop and potential crop trees. It was found that on an area now bearing an average of 17 sugar pine crop and potential crop trees per acre 1.9 trees, or 12%, had become infected with white pine blister rust prior to the reduction of ribes populations to the required control standards in 1948. Less than one half of 1% of the trees examined had become infected since control standards were reached. Previous to establishment of control standards many trees had been fatally infected and subsequently killed by rust infection and, hence, did not figure in the present survey.

A disease survey was made during the 1953 season on 17 blister rust infection centers located from the Eldorado to the Lassen National Forest. Eight of the infection centers had some ribes eradication although the ribes populations had not been fully suppressed on any of them. On only one of these had the rust become established after any ribes eradication work had been done and on it only a few trees were infected.

Ribes suppression had not been maintained on this area, and it had been eliminated in recent years from the management areas because of insufficient sugar pine values. The other nine infection centers had little or no ribes eradication. The rust had intensified on five of the nine unworked centers to a considerable degree. The status of the remaining four centers is unknown due to incomplete data.

These surveys were not designed to serve as research or investigative studies but were made as an aid in reaching administrative decisions concerning these areas. For this reason unequivocal conclusions cannot be reached. However, certain trends and possibilities of blister rust damage appear indicated and general observations regarding the relative intensification of blister rust on worked and unworked areas can be made. Present indications are that ribes eradication has greatly retarded the introduction of blister rust into many of the sugar pine areas in California. It is also apparent that ribes eradication has played the major role in controlling the rust on sugar pine management areas within the present zone of infection.

#### SALVAGE PRUNING STARTED ON INFECTED AREAS

The first pruning of blister rust infected sugar pines in California as a means of reducing infection (accompanied, of course, by ribes eradication) and of salvaging crop and potential crop trees

was inaugurated on the Lookout Point unit on the Shasta-Trinity National Forest during 1954. Rust became established here in 1944 and greatly intensified itself in 1947 and 1948. The management area was selected in 1952 and initial ribes eradication commenced in 1953. Although the initial work will be completed in 1955, ribes populations have been reduced to low levels on most of the unit. Additional damage from blister rust should be slight if ribes suppression is maintained. The area supporting the heaviest infection was selected and infected crop and potential crop trees on 80 acres were pruned. Blister rust cankers were removed from 14 crop and potential crop trees per acre which represents about half of the sugar pine stocking on the area pruned.

Sanitation pruning was also done on the American House infection center on the Plumas National Forest. Blister rust cankers were removed from sugar pines on 29 acres. Infection was found on 7% of the total trees examined. However, 11% of crop and potential crop trees of 4-inch DBH and under were infected.



## WORK ON STATE AND PRIVATE LANDS

The control of white pine blister rust on state and privately owned lands in California is a cooperative undertaking by the State of California, private owners, and the Federal Government. Personnel of the California Division of Forestry and the Blister Rust Control Unit of the Forest Service collaborate closely on program policies, project plans and in working with private timberland owners. Under the terms of a cooperative agreement with the California Division of Forestry signed in June 1954, the U. S. Forest Service is responsible for the execution of the project work.

Through an appropriation of \$125,000 the State of California furnished the major share of funds for the control of blister rust on the state and privately owned lands.

THE STATE OF CALIFORNIA  
PROVIDES FINANCING

Timberland owners under cooperative agreements contributed \$5,350. The participating companies were the Michigan-California Lumber Company, the Southern California Edison Company, the Edison Securities Company, the Stockton Box Company, and the Shasta Forests Company. These State and private funds, when supplemented with Federal funds, adequately financed the work.

The State of California actively entered the blister rust control program in 1941 with an appropriation of \$50,000. A cooperative agreement executed that year and revised in 1952 assigned the

STATE POLICIES BEING  
DETERMINED

direction and execution of the work to the Office of Blister Rust Control in the former Bureau of Entomology and Plant Quarantine. Following the transfer of the blister rust control function to the Forest Service a new agreement between the State of California and the Forest Service was executed on June 8, 1954. This agreement provides a basis for cooperative work to control and prevent the spread of white pine blister rust on state and private lands in California. The policies of the State Board of Forestry, as established at their meeting of March 12, 1954, and incorporated into the new agreement, are:

- "1. The State shall assume the full cost of control on State lands including surveys. Federal expenditures for leadership, technical



supervision, method development, and disease investigations on State land shall qualify for matching of State expenditures for control work on private land.

- "2. The ratio of State expenditures to expenditures of Federal and private cooperators for the protection of privately owned land shall not exceed 50% of total costs including surveys, leadership, technical supervision, method development, and disease investigations.
- "3. The manner of control shall follow the standards approved by the State Forester based on findings and recommendations of qualified control and research agencies dealing with this problem.
- "4. The zones of infection herewith approved for white pine blister rust control are those lands which have been delineated by the Federal Forest Service Blister Rust Control Unit and approved by the State Forester, based upon site, stocking, rust hazard, density of host plants, and management policy of the landowner. The zones of infection herein referred to are further delineated on maps filed with the State Forester."

The cooperative agreement provides that a mutual effort will be made toward "obtaining statements of management policy from owners of land qualifying for control which affirm the interest of the owners in sugar pine management and blister rust control, and by entering into cooperative agreements with private landowners providing for voluntary financial and other cooperation."

The agreement also provides for financial accounting by the Forest Service and for mutual cooperation and assistance. The specific responsibilities and duties of each agency are enumerated.

#### STATUS OF THE PROGRAM

At present there are 7,604 acres of State lands in the control units; initial work has been done on 6,535 acres and is, therefore, 86% complete. Of the total, 23% or 1,759 acres are

now in a maintenance condition.

Of private lands 227,035 acres have been found to qualify for inclusion in the blister rust control program. Initial ribes eradication has been done on 176,539 acres and is now 78% complete. There are 27,967 acres on maintenance, which is 12% of the total.

Except where discussions are continuing with the owners concerning blister rust control work on their lands, reeradication of ribes is proceeding according to schedule.

Ribes were eradicated from 14,427 acres of state and private lands during the 1954 season. Contractors covered 14,215 acres. Dense concentrations of ribes on 79 acres were sprayed with herbicidal chemicals and 133 acres were covered by hired labor. These accomplishments are slightly in excess of the planned work. An additional 8,444 acres were surveyed and found to meet the required control standards without any further work.

PLANNED WORK ACCOMPLISHED
------------------------------

Bid prices for the contract work averaged \$6.62 per worked acre for the state and private lands, while in 1953 the average price was \$6.70 per acre. The range was from a low of \$4.61 in Amador and Eldorado Counties to a high of \$12.01 in Latour State Forest where dense ribes populations were removed initially in areas of high rust hazard.

For the last several years contract prices have been nearly static. Contractors have been plentiful and new ones become interested and enter the field each year. It seems probable that an adequate supply of contractors will continue to be available.

Checking of ribes populations was done on 38,727 acres of the control units. Regular checks were made on all worked areas to determine whether control standards and contract compliance had been reached. Sufficient checks were made on other areas to determine ribes occurrence in order properly to plan the program for the 1955 season.

Blister rust control technicians operated from California Division of Forestry camps at Latour and Mountain Home State Forests and at Burney and Stirling City. The cooperation of the State personnel associated with these camps was excellent and greatly facilitated operations. Four small administrative camps were also established by the Forest Service to facilitate the project.

All necessary eradication work and surveys have been done to keep the project work on schedule except where agreement as to sugar pine management and blister rust control has not yet been reached with the owners. The needed work on some of these privately owned lands is behind schedule, and the investment in ribes suppression will in time be lost unless additional protective work is done to secure the gains already made toward establishing control.



## STATE FORESTS ARE BEING PROTECTED

The timber stands on Latour and Mountain Home State Forests were delineated in 1953, and portions of these forests have been designated by the California Division of Forestry as

sugar pine management areas. Approximately 748 acres of sugar pine in State and County ownership are in the blister rust control units on the Mountain Home State Forest. An additional 750 acres are presently in Federal ownership but are in process of being acquired by the State. Initial ribes eradication will be started on the State lands in 1955. Latour State Forest has 140 acres of western white pine and 1,413 acres of sugar pine in the control units. All initial ribes eradication presently needed on Latour has been finished and future work will follow the disturbance caused by cutting the mature stands.

## CALAVERAS BIG TREES STATE PARK UNIT ENLARGED

The blister rust control unit in the North Grove of the Calaveras Big Trees State Park was enlarged to include the famous South Grove acquired by the State in 1954. The Park, which

includes these two magnificent groves of Big Trees growing in close association with some of the finest remaining sugar pine stands in California, is an outstanding recreational and scenic area.

The South Grove addition was surveyed and ribes eradication plans were worked out in collaboration with the State Division of Beaches and Parks. As a result, a total of 4,203 acres in the Park including buffer zones were selected and approved for blister rust control measures. Ribes had been eradicated on part of this area in previous years, and a limited amount of maintenance work was done in 1951. Ribes eradication was resumed in 1954 when 200 acres were treated. The remainder of the unit requiring ribes eradication will be covered in 1955.

## RECOMMENDATIONS

Because of the general spread and intensification of blister rust in much of the sugar pine types north of Eldorado County, all initial control treatment in this part of the State

should be completed within the next two or three years. In and south of Eldorado County the remaining initial work should be done on all cut-over lands and on the high-rust-hazard areas in mature stands as soon as funds permit. The reeradication of ribes should be kept on schedule for all areas. All sugar pine management areas should be watched closely for the presence of rust infection.





W-928. Young sugar pines growing on private land in the northern Sierra Nevada pine region. The thrifty young pines in the foreground are typical of those which will constitute the future crop.



W-953. High quality sugar pine logs form a large part of the contents of the mill pond at the Michigan-California Lumber Company's modern mill at Camino, California.





## THE NATIONAL PARK PROJECT

The National Park Service is conducting white pine blister rust control projects in Yosemite, Sequoia-Kings Canyon, and Lassen Volcanic National Parks in California. The Park Service has selected white pine stands having high recreational, aesthetic, or scientific values for protection against loss from white pine blister rust. In Yosemite and Sequoia-Kings Canyon ribes eradication work was conducted by the Park Service in 1954. A staff assistant from the Blister Rust Control Unit of the Forest Service, Region 5, was assigned to each of these two Parks to provide technical direction and to direct inspection services. No work was done in Lassen Volcanic National Park in 1954 as it is now on a maintenance basis and such work is required only about every five years.

The first infection of blister rust on a white pine in a national park in California was found on Kings Creek in Lassen Volcanic National Park in 1954. One sugar pine bearing three white pine blister rust cankers was located in an area where infected ribes had been previously found. The infection is outside the control units.

INFECTED SUGAR PINE FOUND  
ON LASSEN VOLCANIC  
NATIONAL PARK

During 1950 the control units in Lassen Volcanic National Park were placed on a maintenance basis. No ribes eradication has been done since. The work plan for 1955 calls for post checking those scattered areas that were worked in 1950 to determine if ribes have regenerated on them. Any areas urgently needing ribes eradication will be recommended for rework during the 1955 season; other areas needing reduction in ribes will be recommended for 1956. Certain areas within the Park should be examined closely for white pine blister rust infection with particular attention paid to Kings Creek where the infected sugar pine was found in 1954.

THE 1955 PLAN FOR LASSEN  
VOLCANIC NATIONAL PARK

The Yosemite blister rust control project completed a successful year. All ribes eradication was accomplished as planned, while the checking and scouting activities proceeded as scheduled. Ribes were removed from a total of 8,207 acres.

YOSEMITE HAS  
SUCCESSFUL SEASON



The Park operated three ribes eradication camps during the following periods:

Crane Flat (25 men) May 25 - October 15  
Chinquapin (10 men) July 19 - September 14  
Chilnualna (40 men, pack camp) June 19 - September 11

The Crane Flat and Chinquapin crews were engaged largely in the reeradication of ribes and in maintenance work. Most of the work was done by specially trained crews working in conjunction with the checkers searching for and working localized spots favorable for ribes regeneration and growth. At the Chilnualna pack camp all the work was initial ribes eradication. The performance of this crew exceeded expectations and 84% of the unit was covered. Consequently, no pack camp will be needed in 1955 and the remaining work can be done by a small camp located at the end of the Empire Meadows road.

The ribes eradication contractors destroyed ribes initially on 757 acres and reeradicated ribes from an additional 473 acres for a total of 1,230 acres. All contracts awarded in 1953 were finished, and the work on an additional 800 acres was contracted for on June 21 at an average price of \$6.00 per acre. In July awards were made on contracts totaling 925 acres. The average bid price was \$7.25 per acre and work is to be completed by September 15, 1955. Bidders were plentiful, hence the bid prices per acre were lower than in previous years for comparable areas.

A checker-foreman and six checkers were employed for the season. The advance check was finished on the Chilnualna unit. Checker-flanker work was done at the Crane Flat and Chinquapin areas. The regular checking was performed on all camp areas and on the contract work in Aspen Valley.

From June 21 to August 20 two trained technicians scouted for white pine blister rust along all readily accessible streams and meadows in the white pine types of the southern and western parts of the Park. These scouts found 50 ribes infected with a rust. All but two were identified by laboratory tests as being infected with pinyon rust (Cronartium occidentale). Two infections from Spider Meadow and vicinity south of the Merced River were tentatively identified as white pine blister rust (C. ribicola). Rechecks in the laboratory gave inconclusive results. Although sugar pines on the areas from which these specimens were collected were examined closely for blister rust, no infected pines were found. It is doubtful, therefore, that any blister rust is present in this locality. During 1955 an intensive search will be made in this vicinity for the presence of blister rust.

All camp superintendents, foremen, checkers, scouts, and about one third of the eradicators were experienced blister rust control men. Ten Navajo youths from the Sherman Institute at Riverside, California were again employed at Crane Flat. Turnover in the crews was very light. Much of the season's success can be attributed to the high percentage of well-trained, experienced personnel.

Three small camps of 15 men each are recommended for the 1955 season. The Crane Flat and Chinquapin camps should continue ribes reeradication and maintenance work by checker-flanker

and spot-work crews. The remainder of the initial work in the Chilnaulna unit should be completed. Work contracted for in 1954 in the Aspen Valley area will be finished, an additional 700 - 1,000 acres of ribes eradication in this vicinity should be advertised for bid and awarded during 1955. One checker-foreman and 10 checkers will be required. One of these technicians should continue the search for possible blister rust infections. The Little Yosemite Valley area should be advance checked preparatory to initiating ribes eradication in 1956.

#### THE YOSEMITE 1955 PLAN

With the treatment this season of the last unworked area in the Redwood Mt. control unit the initial eradication of ribes from all control units in the Sequoia-Kings Canyon National Parks

was completed. Accomplishments in 1954 also brought to near completion the reeradication program in the Park. Control activities thus are entering a new phase in which the several large camps required annually in the past will no longer be needed. Beginning in 1955 the trend will be toward eradication work of a more specialized nature, which will be performed by small crews of skilled workers. To an increasing extent the work will be of a maintenance nature in which the location and treatment of scattered areas regenerating to ribes will be the principal task.

#### SEQUOIA-KINGS CANYON COMPLETES INITIAL WORK

Two ribes eradication camps were operated by the Park in 1954. One, a 60-man hand-eradication crew, was engaged from mid-June to early September in reeradication work in the Redwood Mt. unit. All areas currently requiring ribes reeradication in this unit were treated. The second camp, a 9-man high-country pack camp, completed the first reeradication cycle in the Mt. Whitney foxtail pine unit. This job constituted a follow-up treatment of the 1952 initial chemical eradication of dense Ribes montigenum concentrations. Several eradication techniques



were employed in meeting the variety of problems encountered. In some areas hand eradication supplemented by basal stem applications was used to good advantage, while in others the standard top foliage spray method was found to be advantageous. The initial kill in 1952 was found to be good, and the effectiveness of the second treatment is estimated to be such as to limit further work in the unit to spot treatment of small problem areas.

A late-season inspection of the Chagoopa Plateau foxtail pine unit revealed an excellent kill following the 1953 initial chemical treatment. A 500 parts-per-million aqueous 2, 4, 5-T solution had been applied with hand-operated back-pack units, and the kill was estimated to be of the order of 95%.

With the exception of one ribes eradication contract awarded previously and completed this season, all work was done by camp crews. Two checkers were employed for the entire season.

THE 1955 PLAN FOR SEQUOIA-KINGS CANYON
---

Low country work in sugar pine type will be concentrated in the Giant Forest unit where a small crew will be engaged in the reeradication of Ribes tularens in the Colony Mill

section and in spot-working extensive near-maintenance areas. A program of intensive post checking and checker-flanker work is also planned for the Giant Forest unit in 1955.

A small pack camp is recommended for the Chagoopa Plateau foxtail pine unit. The entire unit should be scheduled for the first ribes reeradication, which will be accomplished by both hand eradication and chemical treatment.





A foxtail pine stand near Crabtree Meadow, Kern River Basin, in Sequoia-Kings Canyon National Parks. Almost pure stands of this tree are found at high elevations in this popular recreational area. Photograph by H. A. Jensen, California Forest and Range Experiment Station.



W-1020. A recreation area in Yosemite National Park where vacationers enjoy the natural beauties of giant sugar pines and Sequoias. The National Park Service preserves these recreational sites for the enjoyment of all the people for all time.





As a result of the reorganization of the Department of Agriculture effective January 1, 1954, all phases of blister rust control work on national forest land were integrated on that date under the direction of the Forest Service. In most instances the Bureau of Entomology and Plant Quarantine's operation supervisors and their assistants were assigned to the national forests to assume the duties of blister rust control officers on the forest supervisors' staff. Because of several resignations in the former Bureau staff, it became necessary to fill blister rust control officer vacancies on the Plumas and Sequoia Forests and assistant blister rust control officer vacancies on the Lassen, Plumas, and Eldorado Forests. In each instance the new officers showed aptitude for the work and were able to carry on with only minor delays at the beginning of the season.

Ribes were eradicated from 18,852 acres of Federal land during 1954. An additional 12,727 acres were checked and found to be sufficiently free of ribes to require no eradication work.

ACCOMPLISHMENTS  
DURING 1954

The summary of ribes eradication by forest is shown in Table 2. About 96% of the work was contracted. The remainder was done by specially trained force-account crews on those areas where contracting was impracticable. In order to facilitate the field work, four small camps were established as follows:

<u>Forest</u>	<u>Camp</u>	<u>Purpose of Camp</u>
Lassen	Spring	Administrative and Eradication
Sierra	Portable	Pine Delineation
Stanislaus	Camp 43	Administrative and Eradication
Shasta-Trinity	Bartle G. S.	Administrative

On the Plumas National Forest a two-man crew was employed to operate a power-spray unit to treat ribes chemically on three areas totaling 27 acres. On the Stanislaus National Forest a six-man chemical eradication crew was engaged from late May to mid-July in treating 151 acres supporting heavy ribes populations. Following the termination of the spray program three members of this crew eradicated ribes along roads, streams, and in isolated small blocks that were not suitable for contract work. The Sequoia National Forest commenced field operations on May 24 when work was started by a chemical spray crew from the Bearskin Camp. The crew covered 117 acres in Converse Basin at an average rate of one acre per man day; the work was terminated on July 3.



## STATUS OF THE PROJECT

Progress toward establishing blister rust control within the sugar pine management units on national forest lands continued at about the same rate as during recent years and in accord-

ance with program plans. The completion of initial eradication work on 9,467 acres of Federal lands this year brings the total initial coverage to 177,181 acres. This is 76% of the initial eradication work scheduled. Eradication work, if continued at the present rate and adjusted to the logging in the units, should keep the rust under satisfactory control.

During the season 22,112 acres received follow-up treatment. At present 27,866 acres or 12% of the total 231,091 acres are at a maintenance level.

## PINE DELINEATION JOB IS COMPLETED

The sugar pine delineation work on national forest lands was completed during 1954. This project had been under way for several years and involved the examination of a total

acreage far greater than that currently within control units. Only those areas supporting adequate stocking of sugar pine have been designated as sugar pine management areas and blister rust control units. The introduction of rigid economic criteria in the selection of stands has resulted in units that restrict control activities to sugar pine stands where values justify management costs, including the cost of blister rust control.

## PLANNED CHECKING WORK IS COMPLETED

The recruiting and proper training of an adequate checking staff still remains one of the knotty problems in the blister rust control program. Checkers are recruited from all the accredited

forestry schools in the United States, from the ranks of previous employees, from various nonforestry colleges and universities. From these sources only a minimum number of competent checkers have been secured to handle the work. The fact that the field season commences early in May and terminates about the first week in October, whereas the majority of checkers are available only during the college vacation period from June through September, complicates the problem. During 1954 as in previous years the field work was accomplished only after the blister rust control officers, by themselves doing strip checking, got the checking program under way. Checkers were occasionally moved from forest to forest and often moved from locality to locality on each forest as necessary to secure the most effective use of them. However, by the end of the season all

the checking work was completed. The problem at hand is to secure competent men who are available from early May until sometime in October. Some of this early and late checking should be considered as training assignments for junior foresters and other young career employees.

Blister rust is now well established in many areas from the Eldorado National Forest northward. In some places outside the management areas heavy losses in the young sugar pine stands are imminent. Therefore, it is recommended that:

RECOMMENDATIONS FOR 1955
--------------------------

1. Any additional areas that might qualify for sugar pine management should be selected in the near future, particularly any areas on the Mendocino, Shasta-Trinity, and Lassen National Forests where the rust is now widespread.
2. Initial ribes eradication be done on all sugar pine management units whether cut-over or mature timber on the Eldorado and forests north thereof as soon as possible.
3. All cut-over sugar pine management areas and all high-hazard areas in the mature timber on the Stanislaus and southward be given an initial working as soon as possible.
4. Infection centers within sugar pine management areas should have all blister rust infection removed by pruning or removal of infected trees. Blister rust control officers should determine the limits and extent of rust spread within these centers.
5. The Lassen, Plumas, and Tahoe National Forests should be scouted extensively for the spread and development of blister rust.

It is also recommended that every effort be made to start the release of potential crop trees and the pruning of sugar pines within the management areas. Since the Forest Service is spending considerable money on ribes eradication, the other management practices essential to the growth of sugar pine should be instituted in order to secure the maximum benefit from all expenditures.







W-887. A party of four partners working together on a contract with the Federal Government eradicate ribes bushes to control blister rust on the Lassen National Forest. The man on the left uses a light-weight back-pack tank to spray toxic 2,4,5-T on a large ribes bush while the other members of the crew uproot the bushes with hand tools.



W-2168. Strawberry Lake on the Stanislaus National Forest, one of many well-developed recreation and special use sites on national forest lands in California. The mixed-coniferous timber, of which sugar pine is an important component, contributes to the aesthetic and scenic value of this popular resort center.





TABLE 1  
ALLOTMENTS FOR FISCAL YEAR 1955

FEDERAL FUNDS	
National Forest Lands	\$279, 000
National Park Lands	197, 170
State and Private Lands	40, 000
Leadership and Technical Direction	<u>88, 000</u>
Total Federal Funds	\$604, 170
COOPERATIVE FUNDS	
State of California	\$125, 000
Michigan-California Lumber Company	4, 000
Stockton Box Company	200
Edison Securities	500
Southern California Edison Company	500
Shasta Forests Company	<u>150</u>
Total Cooperative Funds	\$130, 350
Total All Funds	\$734, 520





TABLE 2

EXPENDITURES IN CALIFORNIA  
FOR THE CALENDAR YEAR 1954

## FEDERAL FUNDS

	<u>Fiscal Year 1954</u> <u>1/1/54-6/30/54</u>	<u>Fiscal Year 1955</u> <u>7/1/54-12/31/54</u>	<u>Total</u>
Forest Service	\$183,604	\$223,754	\$407,358
National Park Service	<u>72,069</u>	<u>165,975</u>	<u>238,044</u>
Total Federal Funds	\$255,673	\$389,729	\$645,402

## COOPERATIVE FUNDS

State of California	\$ 81,834	\$ 53,630	\$135,464
Michigan-California Lumber Company	-	443	443
Shasta Forests Company	<u>-</u>	<u>150</u>	<u>150</u>
Total Cooperative Funds	\$ 81,834	\$ 54,223	\$136,057
Total All Funds	\$337,507	\$443,952	\$781,459

# REPORT ON THE CALIFORNIA FOR THE CALENDAR YEAR 1922

TABLE 2

## FEDERAL FUNDS

	<u>Fiscal Year 1922</u> <u>July 1 - June 30, 1922</u>	<u>Fiscal Year 1921</u> <u>July 1 - June 30, 1921</u>	
Warrent Service	222,722	222,722	
National Road Service	107,717	75,000	
Total Federal Funds	330,439	297,722	

## COOPERATIVE FUNDS

State of California	\$ 21,234	\$ 21,234	
Michigan-California Lumber Company	"	"	
State Forest Company	"	"	
Total Cooperative Funds	\$ 21,234	\$ 21,234	
Total All Funds	\$351,673	\$318,956	



TABLE 3

**STATEMENT OF ALLOTMENTS BY FISCAL YEARS FOR RIBES ERADICATION  
ON STATE AND PRIVATE LANDS  
1942-1954**

Fiscal Years	State of California Contributions			Private Cash Contri- butions	Total State and Private	BEPQ Allotments				Total State Private and Bureau	
	Cash	Other	Total			3101.14		3103.14			Total BEPQ
						71.14	W-a.14 and W-e.14	73.14	W-e.14 and W-e.14		
1942-1954	\$1,419,873	\$285,535	\$1,705,408	\$49,950	\$1,755,358	\$1,378,251	\$1,836,525	\$3,214,776	\$4,970,134		

TABLE 4

**STATEMENT OF ALLOTMENTS FOR RIBES ERADICATION  
ON STATE AND PRIVATE LANDS  
FOR FISCAL YEAR 1955**

Fiscal Year	Contributions			Total State, Private & Federal	Leadership Allotment For All Agencies In California
	State of California	Private	Total State & Private		
1955	\$125,000	\$5,350	\$130,350	\$40,000	\$88,000



# 2010

STATE OF TEXAS  
 DEPARTMENT OF TRANSPORTATION  
 TEXAS STATE HIGHWAY DEPARTMENT  
 1001-1001

Project Name	Project Number	Location		Project Description	Project Status	Project Manager	Project Engineer	Project Designer	Project Contractor
		County	Section						
Project 1	1001	El Paso	Section 1	Project 1 Description	Project 1 Status	Project 1 Manager	Project 1 Engineer	Project 1 Designer	Project 1 Contractor
Project 2	1002	El Paso	Section 2	Project 2 Description	Project 2 Status	Project 2 Manager	Project 2 Engineer	Project 2 Designer	Project 2 Contractor
Project 3	1003	El Paso	Section 3	Project 3 Description	Project 3 Status	Project 3 Manager	Project 3 Engineer	Project 3 Designer	Project 3 Contractor
Project 4	1004	El Paso	Section 4	Project 4 Description	Project 4 Status	Project 4 Manager	Project 4 Engineer	Project 4 Designer	Project 4 Contractor
Project 5	1005	El Paso	Section 5	Project 5 Description	Project 5 Status	Project 5 Manager	Project 5 Engineer	Project 5 Designer	Project 5 Contractor
Project 6	1006	El Paso	Section 6	Project 6 Description	Project 6 Status	Project 6 Manager	Project 6 Engineer	Project 6 Designer	Project 6 Contractor
Project 7	1007	El Paso	Section 7	Project 7 Description	Project 7 Status	Project 7 Manager	Project 7 Engineer	Project 7 Designer	Project 7 Contractor
Project 8	1008	El Paso	Section 8	Project 8 Description	Project 8 Status	Project 8 Manager	Project 8 Engineer	Project 8 Designer	Project 8 Contractor
Project 9	1009	El Paso	Section 9	Project 9 Description	Project 9 Status	Project 9 Manager	Project 9 Engineer	Project 9 Designer	Project 9 Contractor
Project 10	1010	El Paso	Section 10	Project 10 Description	Project 10 Status	Project 10 Manager	Project 10 Engineer	Project 10 Designer	Project 10 Contractor

## 2010

STATE OF TEXAS  
 DEPARTMENT OF TRANSPORTATION  
 TEXAS STATE HIGHWAY DEPARTMENT  
 1001-1001

Project Name	Project Number	Location		Project Description	Project Status	Project Manager	Project Engineer	Project Designer	Project Contractor
		County	Section						
Project 1	1001	El Paso	Section 1	Project 1 Description	Project 1 Status	Project 1 Manager	Project 1 Engineer	Project 1 Designer	Project 1 Contractor
Project 2	1002	El Paso	Section 2	Project 2 Description	Project 2 Status	Project 2 Manager	Project 2 Engineer	Project 2 Designer	Project 2 Contractor
Project 3	1003	El Paso	Section 3	Project 3 Description	Project 3 Status	Project 3 Manager	Project 3 Engineer	Project 3 Designer	Project 3 Contractor
Project 4	1004	El Paso	Section 4	Project 4 Description	Project 4 Status	Project 4 Manager	Project 4 Engineer	Project 4 Designer	Project 4 Contractor
Project 5	1005	El Paso	Section 5	Project 5 Description	Project 5 Status	Project 5 Manager	Project 5 Engineer	Project 5 Designer	Project 5 Contractor
Project 6	1006	El Paso	Section 6	Project 6 Description	Project 6 Status	Project 6 Manager	Project 6 Engineer	Project 6 Designer	Project 6 Contractor
Project 7	1007	El Paso	Section 7	Project 7 Description	Project 7 Status	Project 7 Manager	Project 7 Engineer	Project 7 Designer	Project 7 Contractor
Project 8	1008	El Paso	Section 8	Project 8 Description	Project 8 Status	Project 8 Manager	Project 8 Engineer	Project 8 Designer	Project 8 Contractor
Project 9	1009	El Paso	Section 9	Project 9 Description	Project 9 Status	Project 9 Manager	Project 9 Engineer	Project 9 Designer	Project 9 Contractor
Project 10	1010	El Paso	Section 10	Project 10 Description	Project 10 Status	Project 10 Manager	Project 10 Engineer	Project 10 Designer	Project 10 Contractor

TABLE 1

STATUS OF RIBES ERADICATION IN CALIFORNIA  
AS OF DECEMBER 31, 1954

Ownership	Control Operation	Control Units		Status of Ribes Eradication			
		Total Acres	Acres Unworked	Net Acres By Workings			Acres On Maint.
				Initial	Reerad.	Maint. Work	
Work Done By The State Cooperative Project							
Private Land	Mendocino	600	600				
	Klamath	2,545		2,545	4,219	1,980	2,545
	Shasta-Trinity	1,841	220	1,621			
	Lassen	95,978	31,495	64,483	71,507	185	13,332
	Plumas	29,236	5,452	23,784	29,013		2,373
	Tahoe	984	368	616			
	Eldorado	42,120	7,251	34,869	55,319		3,893
	Stanislaus	43,023	3,030	39,993	51,071		5,574
	Sierra	10,708	2,080	8,628	7,172		250
	Total	227,035	50,496	176,539	218,301	2,165	27,967
State Land	Latour Forest	1,553	381	1,172	24		
	Blodgett Forest	1,160		1,160	2,320		
	Calaveras Big Trees Park	4,203		4,203	6,098		1,759
	Mountain Home Forest	688	688				
	Total	7,604	1,069	6,535	8,442		1,759
Total State and Private		234,639	51,565	183,074	226,743	2,165	29,726
Work Done By The Forest Service							
Federal Land	Mendocino	4,200	4,200				
	Klamath	2,238		2,238	2,326	667	2,238
	Shasta-Trinity	4,239	355	3,884			
	Lassen	11,602	1,202	10,400	7,385		501
	Plumas	57,237	13,046	44,191	56,996		10,449
	Tahoe	18,723	1,719	17,004	4,431		
	Eldorado	35,655	8,104	27,551	24,911		1,899
	Stanislaus	43,375	2,144	41,231	76,970		12,279
	Sierra	47,429	19,338	28,091	30,985		500
	Sequoia	6,393	3,802	2,591			
	Total	231,091	53,910	177,181	204,004	667	27,866
Work Done By The National Park Service							
Federal Land	Lassen Volcanic	17,779		17,779	22,954		15,186
	Yosemite	88,126	8,872	79,254	95,632	1,897	53,622
	Sequoia-Kings Canyon	46,441		46,441	51,911	325	28,161
	Total	152,346	8,872	143,474	170,497	2,222	96,969
Work Done In California							
All Control Operations		618,076	114,347	503,729	601,244	5,054	154,561





TABLE 2

## SUMMARY OF RIBES ERADICATION IN CALIFORNIA

- 1954 -

Ownership	Control Operation	Class of Work	Acres			Total Man Days	Thousands of Ribes Destroyed
			Worked	Checked & Meeting Standards Without Work	Total		
WORK DONE BY THE STATE COOPERATIVE PROJECT							
PRIVATE LAND	Shasta-Trinity	Initial	757		757	493	59
		Initial	1,156	286	1,442	627	104
	Lassen	Reeradication	2,364	2,678	5,042	987	298
		All	3,520	2,964	6,484	1,614	402
		Initial	1,016	80	1,096	423	192
	Plumas	Reeradication	1,699	145	1,844	827	252
		All	2,715	225	2,940	1,250	444
		Initial	180		180	106	21
	Eldorado	Reeradication	2,290	1,123	3,413	716	95
		All	2,470	1,123	3,593	822	116
		Initial	62		62	58	11
	Stanislaus	Reeradication	2,705	3,039	5,744	834	219
		All	2,767	3,039	5,806	892	230
		Initial	1,000		1,000	682	184
	Sierra	Reeradication	711	120	831	719	180
All		1,711	120	1,831	1,401	364	
STATE LAND		Latour Forest	Initial	263	453	716	156
	Reeradication		24		24	14	
	All		287	453	740	170	8
	Calaveras Big Trees Park	Reeradication	200	520	720	86	33
		Initial	4,434	819	5,253	2,545	579
ALL WORK DONE BY THE STATE COOPERATIVE PROJECT		Reeradication	9,993	7,625	17,618	4,183	1,077
		All	14,427	8,444	22,871	6,728	1,656
WORK DONE BY THE FOREST SERVICE							
FEDERAL LAND	Shasta-Trinity	Initial	587		587	475	71
		Initial	1,715	90	1,805	1,221	252
	Lassen	Reeradication	399		399	242	45
		All	2,114	90	2,204	1,463	297
		Initial	745	265	1,010	474	135
	Plumas	Reeradication	1,439	881	2,320	851	122
		All	2,184	1,146	3,330	1,325	257
		Initial	1,888	868	2,756	1,389	402
	Tahoe	Reeradication	2,837	1,594	4,431	1,273	97
		All	4,725	2,462	7,187	2,662	499
		Initial	731	644	1,375	351	59
	Eldorado	Reeradication	1,266	842	2,108	442	90
		All	1,997	1,486	3,483	793	149
		Initial	56		56	97	84
	Stanislaus	Reeradication	3,181	4,528	7,709	1,260	549
		All	3,237	4,528	7,765	1,357	633
		Initial	348		348	417	85
	Sierra	Reeradication	2,150	2,995	5,145	1,369	308
All		2,498	2,995	5,493	1,786	393	
Sequoia		Initial	1,510	20	1,530	1,092	253
ALL WORK DONE BY THE FOREST SERVICE		Initial	7,580	1,887	9,467	5,513	1,341
		Reeradication	11,272	10,840	22,112	5,437	1,211
		All	18,852	12,727	31,579	10,950	2,552
WORK DONE BY THE NATIONAL PARK SERVICE							
FEDERAL LAND	Yosemite	Initial	4,959		4,959	2,328	309
		Reeradication	1,968		1,968	1,878	122
		Maint. Work	1,280		1,280	448	12
		All	8,207		8,207	4,654	443
	Sequoia- Kings Canyon	Initial	100		100	240	90
		Reeradication	4,166	843	5,009	2,779	326
All		4,266	843	5,109	3,019	416	
ALL WORK DONE BY THE NATIONAL PARK SERVICE		Initial	5,059		5,059	2,568	399
		Reeradication	6,134	843	6,977	4,657	448
		Maint. Work	1,280		1,280	448	12
		All	12,473	843	13,316	7,673	859
ALL WORK DONE IN CALIFORNIA							
ALL OWNERSHIPS ALL AGENCIES		Initial	17,073	2,706	19,779	10,626	2,319
		Reeradication	27,399	19,308	46,707	14,277	2,736
		Maint. Work	1,280		1,280	448	12
		All	45,752	22,014	67,766	25,351	5,067





TABLE 3

SUMMARY OF CHEMICAL ERADICATION WORK  
CALIFORNIA - 1954

Control Operation	Land Ownership	Acres Covered	Total Man Days	Thousands of Ribes Destroyed	Thousands of Gallons of Spray Used
Plumas	National Forest	27	61	27	9
	Private	9	12	9	2
Stanislaus	National Forest	151	196	145	78
Sierra	Private	70	166	56	40
Sequoia	National Forest	117	145	50	27
Sequoia-Kings Canyon	National Park	287	101	35	4
All California	National Forest	295	402	222	114
	National Park	287	101	35	4
	Private	79	178	65	42
Total For 1954		661	681	322	160
Accumulative Grand Totals 1946-1954		14,480	15,117	15,230	2,109



TABLE 4

SUMMARY OF ERADICATION BY CONTRACT  
CALIFORNIA - 1954

Land Ownership	Control Operation	Acres Worked By Contractor	Man Days	Thousands of Ribes Destroyed	Average Price Per Acre Paid To Contractor
All Workings (Initial and Reeradication)					
State and Private	Shasta-Trinity	757	493	59	\$10.74
	Lassen	3,520	1,340	402	7.41
	Plumas	2,706	1,047	435	7.26
	Eldorado	2,470	712	116	4.61
	Stanislaus	2,634	760	219	5.23
	Sierra	1,641	1,128	308	6.22
	Latour Forest	287	83	8	12.01
	Calaveras Big Trees Park	200	45	33	7.23
Total State and Private		14,215	5,608	1,580	6.62
National Forest	Shasta-Trinity	587	475	71	9.76
	Lassen	2,114	1,158	297	8.04
	Plumas	2,157	974	230	7.98
	Tahoe	4,725	2,101	499	9.02
	Eldorado	1,997	599	149	5.00
	Stanislaus	2,799	878	460	5.71
	Sierra	2,371	1,388	375	6.44
	Sequoia	1,331	866	201	10.78
Total National Forest		18,081	8,439	2,282	7.64
Nat. Park	Yosemite	1,230	608	72	7.23
	Sequoia-Kings Canyon	100	240	90	27.50
Total National Park		1,330	848	162	8.75
Total For 1954		33,626	14,895	4,024	7.25
Accumulative Grand Totals 1946-1954		161,031	61,803	14,349	\$ 6.49





TABLE 5

SUMMARY OF CHECKING  
CALIFORNIA - 1954

Control Operation	Acres Covered By Check				Total Strip Acres
	Regular	Advance	Post	Total	
Checking Done On State And Private Lands					
Shasta-Trinity	1,067	260		1,327	56
Lassen	5,274	2,132	386	7,792	157
Plumas	5,640	500	1,905	8,045	148
Tahoe		375		375	8
Eldorado	2,944	586	3,735	7,265	170
Stanislaus	4,398		596	4,994	130
Sierra	2,606	1,030	720	4,356	92
Latour Forest	449	865		1,314	38
Calaveras Big Trees Park	296		2,215	2,511	61
Mountain Home Forest		748		748	15
Totals	22,674	6,496	9,557	38,727	875
Checking Done On National Forest Lands					
Shasta-Trinity	1,452			1,452	70
Lassen	5,129	2,695	1,029	8,853	198
Plumas	5,736	915	5,541	12,192	194
Tahoe	4,361	3,702	2,754	10,817	674
Eldorado	2,548		4,913	7,461	154
Stanislaus	5,175	263	6,532	11,970	278
Sierra	4,328		6,640	10,968	233
Sequoia	1,780	2,506		4,286	139
Totals	30,509	10,081	27,409	67,999	1,940
Checking Done On National Park Lands					
Yosemite	6,630	1,640	3,830	12,100	287
Sequoia-Kings Canyon	2,305		1,650	3,955	212
Totals	8,935	1,640	5,480	16,055	499
Grand Totals	62,118	18,217	42,446	122,718	3,314





# BLISTER RUST CONTROL METHODS DEVELOPMENT DURING 1954

## SECTION I. HIGHLIGHTS

By H. R. Offord

The need for continuous effort to develop and demonstrate more effective and economical methods of blister rust control was clearly recognized by the Forest Service a year ago when reorganization and transfer of blister rust control work occurred. The scope of methods development work in sugar pine and western white pine areas of Regions 5, 6, and 1, and personnel engaged in these activities have been maintained at about the level of the past 5 years. At Berkeley, California and at Spokane, Washington, control investigations personnel of R-5 and R-1 have office and laboratory space in the same buildings as the California and the Intermountain Forest and Range Experiment Stations and are aided materially by day to day association with research personnel. Close working relations with Timber Management R-6 and the Pacific Northwest Forest and Range Experiment Station have given fresh impetus to blister rust control studies in Region 6.

In accordance with 1954 objectives of the Annual Program Plans (Chief's Office) and the Annual Plan of Work (Regional Forester R-5) methods improvement work in the sugar pine region of California and Oregon has been continued by Quick, Miller, Burrill, and Offord on: 1. Chemical methods for killing ribes. 2. Systemic and contact fungicides for protection of nursery stock and for salvage of crop trees that are already infected. 3. The ecology of ribes in relation to cutting and management practices in sugar pine forests. 4. Rust-resistant white pines. 5. Disease studies on the status of control. This section of the annual report gives highlights of accomplishments in the above five lines of work; a more detailed account of the principal activities is provided by Sections II, III, and IV that follow.

### 1. Improvements in Chemical Control of Ribes.

Several improvements in chemical methods were recommended to control supervisors during 1954. Field tests of 1953 clearly showed that the sodium salt of 2,4-D was superior to the ester formulations for foliage spray of Ribes roezli in the central portion of the Sierra Nevada. For foliage spray of R. roezli in the northern Sierra Nevada (from the Plumas National Forest north) the recommended formulation is a mixture of 2,4-D and 2,4,5-T esters. A new titanium dioxide paint pigment (trade designation Titanox A-WD) is now available for use with aqueous 2,4-D sprays where a semi-permanent leaf marker

is desired. Titanox A-WD is better than the older material Titanox B-30 because it contains a dispersing agent which minimizes sedimentation in supply pipes and valve lines of the spray rigs. Populations of young Ribes roezli (6 to 10 years old without layering stems) can be killed satisfactorily with aqueous 2,4-D sprays at 250 p.p.m. acid equivalent. Further tests with dry 2,4-D pellets continue to show that they will selectively damage or kill the low-growing and highly susceptible R. roezli, and leave the associated conifers relatively undamaged.

New herbicides tested in 1954 include: 2,4,5-trichlorophenoxypropionic acid; 2,2-dichloropropionic acid (Dalapon); 3-amino-1,2,4-triazole (Amizol); and several derivatives of dimethylurea. In California, Idaho, and Oregon these new herbicides were tested on ribes and on sedges, weedy grasses, and brush species of importance to the planting of white pines. From tests in Idaho there is some evidence that the phenoxypropionic compounds are less toxic to conifers than the phenoxyacetic analogues. Two hundred and thirty-five field tests of herbicides were made in California and 33 in Oregon during the season of 1954.

## 2. Fungicides.

Artificial inoculations of white pine seedlings (previously sprayed with three different fungicides) at the Spokane nursery in September 1953 failed to cause infection of the controls or the fungicide-treated seedlings. These preliminary tests are therefore inconclusive. In cooperation with Pacific Northwest Forest and Range Experiment Station and Timber Management R-6, scheduled tests of Fermate sprays for the protection of sugar pine seedlings at Wind River Nursery were completed July to October 1954. The purpose of these tests is to determine the cost and practicability of using a fungicide as part of routine nursery procedure to prevent infection of white pines in seedling and transplant beds.

Further examination of branch cankers and excised cankers on western white pine and sugar pine treated with fungicides shows definite selectivity in toxic action of Acti-dione, 2,4-D, 2,4,5-T and Rimocidin on the foliage of infected and non-infected branches. Fruiting of cankers has been notably suppressed following treatment with Acti-dione, Rosin Amine D pentachlorophenate, and calcium sulfamate. More time is needed to appraise the selective toxicity of these fungicides to infected and healthy branches and their effectiveness in killing traces of mycelium around the margin of excised cankers.



### 3. Ribes Ecology-Pine Management.

Studies on the ecology of ribes in relation to prescribed methods of sugar pine management in southern Oregon were initiated in 1954. Three plots were located on the Zinc Creek and Junction Springs timber sale areas (Umpqua National Forest) to study ribes regeneration on clearcut-burns. Two additional plots were established in dense virgin timber on the South Umpqua Experimental Forest on the sites of proposed clearcut-burns.

Hygrothermographs were installed on one of the Zinc Creek clearcut units to provide local weather data of interest in rust behavior and regeneration of ribes and sugar pine. Maintenance checks were made of long term ribes ecology plots in California, including those in the California Forest and Range Experiment Station Dodge Ridge sugar pine cutting tests, and those on the Lassen, Plumas, Stanislaus, and Sierra National Forests. In the ecology of Ribes roezli, emphasis is currently being placed on problems of regeneration after logging and after brush removal by mechanical and chemical means. Publications of 1954 included "Ecology of the Sierra Nevada Gooseberry in Relation to Blister Rust Control," Clarence R. Quick, U. S. Department of Agriculture Circular No. 937, March 1954.

### 4. Rust-Resistant White Pines.

In Regions 5 and 6, the program for the testing of rust resistance in sugar pine was given increased attention during 1954. One-pound samples of sugar pine seed were collected from various seed zones and sites throughout the range of sugar pine in Oregon and California. Experiment Station and Regional Office personnel, Forest Supervisors, and State cooperators helped to make these seed collections. Rust resistance in the several lots of open-pollinated seedlings will be compared with one another and related to geographic location of seed trees. In the spring of 1955, nursery production of test seedlings will be undertaken at Wind River Nursery, Washington.

The Rogue River National Forest (Mill Creek) outplanting of rust-resistant selections (grafts) and control seedlings of Pinus monticola furnished by R-1 was checked June 18, 1954. Of the original 12 resistant grafts 5 are alive; none of these is infected. Surviving control seedlings and volunteer white pine on the plot now total 24 trees (36) control seedlings outplanted in 1951); 11 of these controls are now infected.

The rust-resistant sugar pine trees (3 on the Lassen, 2 on the Shasta-Trinity, and 2 on the Klamath National Forests of California) were



examined during the 1954 season and all are still free of cankers. Western white pine trees in an old and heavy rust center on Bohemia Mt. on the Umpqua National Forest of Oregon were examined; 15 trees were found to be rust-free. Cones from some of these trees were collected (Timber Management R-6) in the fall of 1954.

In Region 1, all phases of the cooperative breeding project on the development of rust-resistant western white pine were continued. Reference should be made to the blister rust control report for Region 1 for accomplishments in this important activity. Publications for 1954 included: "Self-compatibility and Effects of Self-fertility in Western White Pine," by R. T. Bingham and A. E. Squillace, *Journal of Forestry* (In Press), "Breeding for Improved Growth Rate and Timber Quality in Western White Pine," by A. E. Squillace and R. T. Bingham, *Journal of Forestry* 52(9): 656-661. September, 1954.

#### 5. Disease Studies on Status of Control.

During 1954 a three-man crew at Mill Creek, Rogue River National Forest, Oregon, recorded disease (5% systematic sample) on the 126 acres from which ribes had been eradicated in 1953. Also, as part of the Mill Creek disease study, some 1,600 acres outside the control unit and lying west of Rogue River were surveyed to determine existing ribes populations. One patch of vigorous Ribes lobbi was found on the top of the ridge about 1<sup>1</sup>/<sub>2</sub> miles from the center of the Mill Creek plot, but these ribes resulted from 1947-1948 logging and could not have contributed to the 1947 infection on the Mill Creek plot. The first infection of white pine in Oregon clearly associated with R. cereum was studied in a small circular plot (800 western white pine trees) near Union Creek.

Ribes eradication work on the 10-chain buffer zone study at Goat Creek, Burney area, was completed by a three-man crew. Also, a 10% randomized sample of pine infection was taken on the entire 64.4-acre plot. The following one-acre status-of-control plots were checked: Big Canyon Creek, Eldorado National Forest (ribes only); Buckhorn Lodge, Burney area (ribes only); Mill Creek, Rogue River National Forest (pine and ribes); Woodruff Creek, Rogue River National Forest (pine and ribes); Snag Creek, Rogue River National Forest (pine and ribes).

Rust conditions were sampled on the Siskiyou, Umpqua, Rogue River, Shasta-Trinity, Lassen, Plumas, Tahoe, Stanislaus, Eldorado, and Mendocino National Forests and on Yosemite National Park. 1954 was a poor year for spread and intensification of blister rust on ribes in the Sierra Nevada and in southern Oregon. Four hundred and ninety

rust samples from the fall scouting work were identified as pinyon or blister rust by laboratory procedures at Berkeley.

It was not possible to initiate studies on rust behavior in relation to local and general climate on the basis of Washington conference plans of May 1954. Research pathologists from the California Forest and Range Experiment Station and Pacific Northwest Forest and Range Experiment Station gave increased attention to blister rust problems, largely those relating to growth rate of cankers in sugar pine and extent of mycelial growth beyond visible edge of the canker. At Berkeley, the California Forest and Range Experiment Station has worked out a cooperative research contract with the Department of Plant Pathology, University of California, for critical review of methods now used for identifying blister rust and pinyon rust. In Region 1, damage to mature trees--especially the time to kill crowns at various heights, will be studied on newly established plots. Blister rust control leaders in Regions 1, 5, and 6 are agreed that first priority on needed research should be given to studies of rust behavior in relation to micro- and macro-climate. We should be able to delimit trouble spots in advance of serious rust damage more closely than heretofore, so that we can establish control standards with assurance at their most economic level.





## SECTION II. RIBES ECOLOGY IN CALIFORNIA AND OREGON, 1954

By C. R. Quick

During 1954, about a month was spent studying ribes ecology on the South Umpqua Experimental Forest, Pacific Northwest Forest and Range Experiment Station, about 20 miles northeast

### RIBES ECOLOGY STUDIES STARTED UMPQUA NATIONAL FOREST, OREGON

of Tiller, Umpqua National Forest, Oregon. Several plots were initiated as a start towards a detailed ecologic study of ribes in relation to the clearcut-burn method of timber harvest and forest regeneration. Brief descriptions of these studies are contained in "Progress Report on Ribes-Ecology Plots Established on the South Umpqua Experimental Forest, 1954," November 8, 1954, 20 pp., typewritten.

As in previous years, several days were spent in the field with blister rust control operation supervisors discussing, to mutual advantage, various ribes-ecology and chemical-eradication problems and their solutions.

The exclosure plot series, when established in 1940, consisted of four plots. Each plot consisted of four 1/40-acre subplots inside, and four subplots outside a six-wire fence.

### STUDIES ON THREE EXCLOSURE PLOTS COMPLETED

Locations of the four plots are as follows: (1) near Signal Peak, Chowchilla Mt., Sierra National Forest, (2) Cow Creek, north of Pinecrest, Stanislaus National Forest, (3) Big Bar Mt. ridge, west edge of Plumas National Forest, and (4) Lake Almanor, just south of the lake, Lassen National Forest. The first three plots have passed through their most useful ecologic life and have been abandoned. As time and opportunity permit, summary reports will be prepared for these three plots.

The Lake Almanor exclosure plot, initiated in 1940, was "rejuvenated" in August by removing a heavy cover of brush from selected portions of the plot. Brush should be removed from additional subplots during 1955. The objective of brush removal at this stage of plot development is to see what effect such disturbance has on subsequent intensity and duration of ribes regeneration, i.e., on seedling occurrence and seedling growth. Half of the subplots will remain undisturbed to afford direct comparison of ribes-regeneration data from denuded and undisturbed subplots, both inside and outside the fence.

Figure 1 shows the Chowchilla Mt. Sierra National Forest exclosure plot shortly after establishment. Within a decade the fence was rather completely engulfed by the rapidly developing brush. Figure 2 shows the south fence of the exclosure plot on Big Bar Mt. ridge, Plumas National Forest, five years after the fence was built. When the plot was initiated in 1940 the tall deerbrush inside the fence was as low and "knobby" as that shown in the foreground outside the fence.

# RIBES REGENERATION STUDIED ON ONE-ACRE PLOTS

Eight one-acre ribes-regeneration plots were established on blister rust control units during the period 1937-1940. These plots and their approximate locations are as follows: (1)

Shaver Timber plot, 1 mile south of Shaver Lake-Dinkey Creek road summit, Sierra National Forest, (2) Blue Canyon plot, northeast edge of Blue Canyon, Shaver Lake area, Sierra National Forest, (3) Pilot Peak plot, about 2 miles west of Westfall Guard Station, Sierra National Forest, (4) Signal Peak plot, just southeast of Signal Peak, Chowchilla Mt., Sierra National Forest, (5) Inter-Road plot, south edge of Section 3, Big Bar Mt. ridge, Plumas National Forest, (6) Gentle Gully plot, near center of Section 2, Big Bar Mt. ridge, Plumas National Forest, (7) Rock Creek plot, about 1 mile southeast of Dean's Valley, near Meadow Valley, Plumas National Forest, and (8) Fanianni Area plot, west of Almanor, Lassen National Forest. These plots are checked at one- to four-year intervals, the spacing of checks depending principally upon rate of change in gooseberry populations on the individual plots. The Shaver Timber, Signal Peak, and Fanianni Area plots were checked in 1954.

The following tabulation provides a chronological history (1940-1954) of ribes regeneration collected from the Fanianni Area one-acre plot.

Date of Check	Number of Ribes Plants	Feet of Ribes Live Stem	Date of Check	Number of Ribes Plants	Feet of Ribes Live Stem
July 1940	(Ribes eradicated.)		8/6/47	168	708
7/25/40	5	9	Fall 1947	(Ribes eradicated.)	
8/1/41	16	38	8/25/48	10	9
7/28/42	17	40	9/13/49	19	28
1942-43	(Plot area logged.)		9/2/50	22	42
7/22/43	19	35	8/17/51	25	72
8/28/44	29	74	9/5/52	31	124
7/23/45	130	142	8/1/53	37	179
8/13/46	133	230	8/6/54	32	228



The Blue Canyon one-acre plot was near the center of the Bretz Mill burn of August 1947. All conifers on the plot and surrounding area were killed and the plot was abandoned. Figure 3 shows a very large old gooseberry bush on the Blue Canyon plot prior to the burn practically crowded out of the vegetation by other plants, largely by a good stand of vigorously developing poles. Figure 4 shows innumerable ribes of great vigor growing on the same area three years after the burn. Prior to the burn the whole plot had shown practically no ribes regeneration for eight years. Figure 5 shows a portion of the Pilot Peak one-acre plot, Sierra National Forest. Ribes plants grow slowly--and are exceedingly hard to find--in this type of dense ground cover. But such well-developed types of ground-cover, if carefully cleaned of all ribes tend to remain indefinitely free of ribes.

A few detailed studies of ribes regeneration which were established prior to 1940 are being continued on burns, and on selected methods-of-cutting plots of Forest Management Research, California Forest and Range Experiment Station. Ribes regeneration has slowed down gradually on these long-established plots, and individual plots now need detailed inspection at less frequent intervals than formerly. A series of small plots, from which all ribes were removed annually as current-season seedlings, were established in the period 1936 through 1940. At the present time only a few of these plots are being continued. Several other ribes-ecology plots were visited in 1954, but not checked in detail.

Vegetational changes take place rather rapidly on the small "denuded" plots from which all brush was removed at initiation with hand tools and herbicides. These denuded plots

ARTIFICIALLY DENUDED OR  
"BRUSH-OFF" PLOTS

require one or more detailed inspections each summer. Several other small plots recently established on mechanically denuded areas such as fire lines, logging scars, road-cuts, etc., also require detailed checks at least once each year if the continuity of ribes regeneration and of general vegetational development is to be successfully recorded. Figure 6 shows a part of the Big Bar Mt. "Brush-off" plot, the first season after plot initiation. To date these denuded plots have not regenerated ribes as vigorously as was expected.

One very small mechanically-denuded plot of three milacres was established on July 13, 1954, on a small bulldozer disturbance about half a mile east of Signal Peak Lookout, along the upper Bear Wallow road, Chowchilla Mt., Sierra National Forest.

RIBES SEEDS IN SOIL ARE  
LONG-LIVED



In 1950 or 1951 a bulldozer cleared a short road-cut of dirt and rocks by pushing the material out of the cut and off the shoulder of the road at the end of the cut. There thus resulted a short blade-wide downward-sloping incline of dirt and rock away from the shoulder of the road toward a shallow drainage swale. A road crew "brushed" the edges of the road in late 1953 or early 1954, and piled and burned brush on that portion of the bulldozer "track" closest to the road. A heap of ashes and debris from this burned pile of brush largely covered one portion of the plot (milacre A), while the other portions (milacres B and C) were free of burn disturbance and ashes. No ribes were found in 1954 on the burned milacre, but 142 gooseberries (total live stem, 385 feet) were removed from milacre B, and 146 gooseberries (total live stem, 478 feet) were removed from milacre C. The enormous regenerative capacity of the Sierra Nevada gooseberry can be appreciated when it is realized that this area was first eradicated of ribes in 1936, and has been largely free of fruiting ribes since that initial eradication. The continuing regeneration of ribes on the burned and unburned portions of this small plot will be recorded.

Figure 7 shows part of a small regeneration plot on a recently-logged area northeast of Humbug Valley, Lassen National Forest. The plot was established in a small bare opening on a site of relatively low quality. Under the conditions shown ribes do not regenerate vigorously, but may continue to regenerate slowly for a long time.

DODGE RIDGE EXPERIMENTAL FOREST
------------------------------------

Ribes regeneration on the Doge Ridge Experimental Forest, California Forest and Range Experiment Station, south-east of Pinecrest, Stanislaus National Forest, is being studied on the following

series of plots: (1) 50 randomized milacres, Section 26, T.4N., R.18E., (2) 50 randomized milacres, Section 27, (3) a small plot (25 milacres, or 1/40 acre), Section 27, (4) two small plots (25 milacres each), Section 26, (5) another small plot (25 milacres), Section 27, and (6) two more small plots (each 25 milacres), Section 28.

Figure 8 pictures a portion of the clearcut and mechanically denuded area back of Landing #6, SE1/4, Section 28, Dodge Ridge Experimental Forest. This site was chosen for one of the grouped-milacres plots on which to follow seedling regeneration of ribes and development of general vegetation. Data from this Landing #6 plot have been summarized and will be discussed in a special report. Eight ribes seedlings with a total of 12.7 feet of live stem were removed from this plot on June 16, 1952, and 12 ribes seedlings with a total of 69.3 feet of live stem were removed on July 10, 1954. Many other ribes were removed by blister rust control contractors from the surrounding area in 1952 and 1954. The following numbers of current-season brush seedlings were observed on this plot since initiation in 1950:

Manzanita, 117; Ceanothus, 108; Ribes 36; and other brush species, 9; a total of 270 brush seedlings in five seasons (1950-1954 inclusive). Average numbers of brush seedlings older than current-season seedlings found on the plot are as follows: Arctostaphylos patula, 23.3; Ceanothus cordulatus, 27.5; Ceanothus parvifolius, 30.0; Ribes roezli, 7.5; Rubus parviflorus, 2.0; and Prunus emarginata, 1.0; an average total of 91.3 older seedlings.

A few of the brush species on Landing #6 clearcut and adjacent areas are "sprouters," that is, they commonly regenerate after severe disturbance from residual underground parts rather than from seedlings. From the standpoint of forest regeneration the most serious of these sprouters is chinquapin. Control of this species was attempted on the Landing #6 plot by simply pulling up the chinquapin sprouts as they appeared. The following list records by dates the number of sprouts pulled from the 1/40-acre plot: July 22, 1950, 431; June 19, 1951, 595; August 30, 1951, 600 (estimated); July 21, 1952, 15; July 11, 1953, 15; July 10, 1954, 1. This adds up to a lot of chinquapin sprouts, but also indicates that eradication of chinquapin from clearcut areas is far from impossible.





### SECTION III. FURTHER DEVELOPMENT OF METHODS FOR CHEMICAL CONTROL OF RIBES

By C. R. Quick and W. S. Burrill

The testing of chemical herbicides for control of ribes in California continued through 1954 along lines similar to those of previous years. In 1954 as in 1953 no seasonal help was available for experimental chemical control work.

Some 235 small plots were initiated in 1954 on the Lassen, Plumas, Toiyabe, and Stanislaus Forests, and on Sequoia National Park. Fifteen plots were treated with herbicidal powders and

235 NEW TEST PLOTS IN 1954

pellets, 15 with basal-stem oil sprays, and 205 with aqueous foliage sprays. Many of the test plots were located on the 1945 burn on Wood's Ridge, near Camp 43, Groveland District, Stanislaus National Forest, where numerous plots were initiated in 1953. To a large degree, the relatively simple problems of chemical eradication of 6- and 8-year-old Ribes roezli Regel, the Sierra Nevada gooseberry, on areas such as the Wood's Ridge burn, have been solved. In the future most of our chemical eradication tests will be concerned with age class and ecologic forms of ribes that are more difficult to kill. However, the area remains a good place to test new chemicals and new formulations by direct comparison with older and more standardized formulations.

Major series of tests initiated in 1954 concern: (1) New formulations of well-known herbicides, (2) Experimental formulations of newly developed herbicides such as 2, 4, 5-TP, that is

PHENOXYPROPIONIC ACID  
TESTED FOR FIRST TIME

2(2, 4, 5-trichlorophenoxy)-propionic acid, (3) Herbicidal derivatives of dimethylurea, (4) Broadcast and basal-area tests with pellets containing 2, 4-D and 2, 4, 5-T, (5) Additions of boric acid and/or sugar (sucrose) to standardized 2, 4-D formulations, and (6) Additions of vegetable oil, summer spray oil, emulsive oil, and a "non-phytotoxic" spray-amendment oil (Socony Vacuum Oil Company, "Sovaspray 100") to standardized sodium-salt and long-chain ester formulations of 2, 4-D. Tests initiated in 1954 cannot be accurately evaluated at the present time.

## LARGE SCALE OPERATIONS TESTS

The large-scale replicated tests of several commercial formulations of 2,4-D, put out in 1953 along the Old Eleanor Trail, Jawbone Area, Stanislaus National Forest, by Carl W.

Fowler's five-man spray-crew, were checked and summarized by W. S. Burrill. Shown in the table below are the average bush-kill percentages of decadent Ribes roezli--a difficult growth-form to kill--after spray treatment with the several formulations of 2,4-D.

Chemical Form of 2,4-D	Commercial Formulation of 2,4-D	Percent Bush Kill of <u>Ribes roezli</u>	
		At 250 ppm AE	At 500 ppm AE
Sodium salt, monohydrate	Monsanto Chemical Company "Sodium salt of 2,4-D"	70	83
Sodium salt, monohydrate	Dow, "Sodium salt of 2,4-D (Powder)"	-	76
Butoxyethanol ester	American Chemical Paint Co. "Weedone LV-4"	45	66
Isopropyl ester	Dow Chemical Company "Esteron 44"	67	53
Triethanolamine salt	Standard Agric. Chemicals Inc., "Stantox 40"	-	52

The first two formulations are powders, the rest are liquid. Similar small-scale tests confirm this type of reaction on old-age R. roezli in the central Sierra Nevada. It is believed that many liquid formulations of 2,4-D contain potent penetrants, detergents, etc., which actually reduce the bush kill of this very susceptible gooseberry.

## MANY 2,4-D PRODUCTS EFFECTIVE ON GOOSEBERRY

A series of small plots were put out in 1953 on 3- to 8-year-old gooseberry bushes near Wood's Ridge, Stanislaus National Forest, to test foliage sprays of the following seven formulations of

long-chain esters of 2,4-D: (1) 2,4-D acid plus "Carbowax 1500," (2) American Chemical Paint Company, "ACP-648," (3) "ACP-L-129," (4)



California Spray-Chemical Company, "Estercide D-4," (5) Dow Chemical Company, "Esteron Ten-Ten," (6) Pittsburgh Agricultural Chemical Company, "LV-400," and (7) American Chemical Paint Company, "Weedone LV-4." A similar series was designed to compare seven formulations of acids, short-chain esters and amine salts of 2,4-D: (1) acid plus triethanolamine, (2) emulsifiable acid ("ACP-638"), (3) methyl ester, (Dow, "Esteron 20"), (4) isopropyl ester, (Dow, "Esteron 44"), (5) isopropyl ester (SAC, "Stantox P-44"), (6) triethanolamine salt (Veith, "Killtox 40"), and (7) triethanolamine salt (Standard Agricultural Chemicals, "Stantox 40"). Each material was applied at 125 ppm, 250 ppm, and 500 ppm acid equivalent. Two of the long-chain ester formulations (ACP-648, and Pittsburgh LV-400), and 5 of the acids, short-chain esters and amine salt formulations (ACP-638, Esteron 20, Esteron 44, Killtox 40, and Stantox P-44) killed all test ribes. ACP LV-4 and Estercide D-4 killed all ribes at 250 ppm and 500 ppm. The triethanolamine salt prepared in the field by dissolving 2,4-D acid with triethanolamine killed 100% of the plants at 500 ppm, 93% at 250 ppm, and 86% at 125 ppm. Each of these percentages represents a single test, and the differences, of course, may not be statistically significant. In any event, in the central Sierra Nevada, a fair assortment of chemical forms and commercial formulations of 2,4-D, if carefully applied, will kill all or nearly all Ribes roezli plants in the 3- to 8-year-old age range.

Another series of small plots of 3- to 8-year-old gooseberries on the same area compared the effects of adding 1% propylene glycol (a deliquescent material), of 1% summer spray oil, and

AMENDMENTS DO NOT  
INCREASE KILL

of both glycol and spray oil, to formulations of 2,4-D salts. The following four formulations were used: (1) 95% sodium salt monohydrate ("2-4 Dow Weed Killer, Sodium Salt of 2,4-D (Powder)"), (2) 98% monohydrate salt ("Monsanto Sodium Salt of 2,4-D"), (3) 83.5% ammonium salt (du Pont "Weed Killer 2,4-D"), and (4) 2,4-D acid (American Chemical Paint Company) dissolved in the spray solution with baking soda. The average proportion of bushes killed by the four formulations, at an acid-equivalent concentration of 125 ppm, with and without additions of propylene glycol and/or spray oil, are as follows:

Controls: No Additives . . . . .	100%
Propylene Glycol, 1% . . . . .	96%
Summer Spray Oil, 1% . . . . .	92%
Propylene Glycol AND Spray Oil, 1% Each . . .	80%

At 125 ppm, 250 ppm, and 500 ppm acid equivalent, all formulations without additions (12 plots), killed all gooseberry plants to which they were applied. The 2,4-D acid dissolved with baking soda, with and with-



out additions of propylene glycol and/or spray oil (10 plots) killed all gooseberry plants to which applied. The above tests show that in the central Sierra Nevada additions of propylene glycol or of spray oil to salt formulations of 2,4-D are unnecessary, and may reduce the effectiveness of the primary toxicant.

#### TESTS WITH MCP

A number of tests were made in 1953 on Ribes roezli with formulations of MCP, that is, with 2-methyl-4-chlorophenoxyacetic acid, a chemical closely related to 2,4-D. Similar tests were made in 1952 and reported in 1953. The following formulations of MCP were applied in the tests here reported: (1) amine salt (Dow, "MCP Amine Weed Killer"), (2) Butoxyethanol ester (American Chemical Paint Company, "ACP-904"), and (3) sodium salt (Chipman, "Methoxone"). At 500 ppm and at 1000 ppm each of these MCP formulations killed all treated gooseberries, except occasional bushes with crowns protected under logs. In general MCP is believed to be somewhat less positive and dependable than 2,4-D on R. roezli in the central Sierra; at least MCP offers no apparent advantages over 2,4-D.

#### BASAL STEM TESTS

Some experimental formulations of the butoxyethanol esters of 2,4-D (American Chemical Paint Company, "ACP-L-290") and of 2,4,5-T ("ACP-L-533") were tested as basal-stem applications on old R. roezli bushes of a decadent growth form not well adapted to basal-stem application. On the Lassen National Forest about 65% of the bushes were killed; on the Plumas National Forest, 90-96%; and on the Sequoia about 75%. On the Plumas National Forest a comparative test of these experimental materials with a long-available, commercial formulation of isopropyl ester of 2,4-D (Standard Agricultural Chemicals, "Stantox P-44") was made. The commercial formulation was just as effective as the experimental materials. Stantox P-44, in 3% solution, killed 97% of treated gooseberries.

Concentrated solutions of polyethylene glycol 600 mono ester of 2,4-D (American Chemical Paint Company, "ACP-648"), plus propylene glycol and water, were applied to small plants of R. roezli and R. nevadense on Sequoia National Park with the Banta and Driscoll Company's "Hi-Fog Gun" to simulate aircraft spray of concentrated water-soluble and water-miscible materials. This treatment resulted in a very considerable live stem reduction (80% to 92%), but a very low bush kill (10% to 13%). Conifers were damaged by these aqueous 2,4-D solutions to an extent comparable to that previously noted for 2,4-D in oil.

Experiments were continued with two herbicidal derivatives of dimethylurea: (1) phenyldimethylurea (General Chemicals Division, "PDU, " "URAB, " or "Compound 2049"), and (2)

#### DIMETHYLUREAS

chlorophenyldimethylurea (du Pont, "CMU, " "Telvar W, " or "Karmex W"). Treatments with aqueous-suspension sprays of PDU and of CMU, at the rate of about 4 ounces per 1,000 feet (9.3 grams per 100 feet) of ribes live stem applied to Ribes roezli on the Sequoia National Park, and to R. montigenum on the Toiyabe National Forest, show promising results. Reduction of ribes live stem in 1954 from treatments made in 1953 run as high as 90% on R. roezli, and 95% on R. montigenum. PDU and CMU, as dry powders, and as pellets, were applied to clumps of R. cereum on the Lassen National Forest and on the Sequoia National Park, and to R. montigenum on the Toiyabe National Forest. The dry materials, at the rate of 2.5 and 5.0 grams per 100 feet of ribes live stem, were scattered on the crowns and immediately adjacent ground areas. These lighter treatments appear slightly less promising than the spray tests of aqueous suspensions of the same materials, but due to the slow and continuing action of the dimethylurea derivatives, final results will not be available until 1955 or 1956.

To simulate aircraft application, hand-sown broadcast and bush-area treatments with 2,4-D methyl-ester pellets (American Chemical Paint Company, "ACP-L-516A, " 20%; and

#### PHENOXYACETIC HERBICIDES IN PELLETS

"ACP-L-516B, " 30%), and with 2,4,5-T butyl-ester pellets (American Chemical Paint Company, "ACP-L-516C, " 20%), were continued on R. roezli at Wortman's Mill, Sequoia National Park. Up to 90% of small low ribes bushes have been killed by two treatments spaced approximately a year apart. Young R. roezli on 6 small plots at Wood's Ridge, Stanislaus National Forest, were treated in 1954 with 2,4-D pellets (ACP 516A, 516B, 516C, and 316) by spot application about the crowns of individual plants.





## SECTION IV. DISEASE STUDIES IN CALIFORNIA AND OREGON

By D. R. Miller

### Scouting for White Pine Blister Rust - 1954.

Scouting for white pine blister rust during the summer and fall of 1954 revealed that there was no long-distance spread of the disease from aeciospores produced at northern

sources to ribes growing at the fringe of and beyond the known infection zone. Climatic conditions during the spring appeared to be favorable for more than the light spread of the rust to ribes which did occur. In addition, the long dry period during the summer and fall prohibited all but a small amount of rust intensification on ribes leaves. Thus, infected bushes (except beneath sporulating cankers) were not only hard to find but they were lightly infected. Telia (for identification purposes) were often absent on the rusted bushes.

NO LONG-DISTANCE SPREAD  
OF RUST

Ribes infected by blister rust were confined generally to the immediate vicinity of cankerous pines. In only a few cases were the rusted ribes located more than a few chains from

sporulating cankers. This condition held true for southern Oregon as well as for California. Conditions necessary for rust development on ribes appeared to become less favorable as progress was made southward. On the Tahoe and Eldorado National Forests ribes infected with blister rust were usually found within a chain or so of sporulating cankers, and some pine infection centers were found on these forests that had no rusted ribes present. The two infection centers on the Stanislaus, where sporulating cankers were found (one of these centers had 26 infected trees present) had no rusted bushes present, indicating unfavorable conditions for rust development on ribes in the central and southern Sierra Nevada.

INFECTED RIBES CONFINED TO  
VICINITY OF CANKEROUS PINE

In 1954, pinyon rust on forests other than the Stanislaus and Eldorado occurred only at those spots harboring conditions highly favorable for its incidence and development. Under these conditions accumulated evidence shows that pinyon-rusted areas can be

PINYON RUST USED AS  
INDICATOR FOR BLISTER RUST

used as indicator spots when watching the spread of blister rust. The spread of pinyon rust in 1945 was restricted to the smallest area yet recorded. The main spread, although exceptionally light, occurred on the Eldorado and Stanislaus National Forests and in the Yosemite National Park. Only three rust samples collected to the north of the Eldorado were determined to be pinyon. One of these occurred on the Tahoe and two on the Lassen. Only five rusted bushes were found south of Yosemite and all of these supported pinyon rust. Four of these samples were from the Sierra and the fifth was from the Sequoia.

Rust samples were collected from every area where rusted ribes were found if the infected leaves supported the telial stage. The results of these determinations are presented in the following tabulation.

Area	Identification of Sample			Total
	Blister Rust	Pinyon Rust	Indefinite	
Umpqua	46	-	3	49
Rogue River	15	-	-	15
Siskiyou	1	-	-	1
Klamath	1	-	1	2
Mendocino	1	-	-	1
Shasta-Trinity	93	-	-	93
Lassen	36	2	10	48
Plumas	29	-	6	35
Tahoe	35	1	-	36
Eldorado	12	35	-	47
Stanislaus	2	105	1	108
Yosemite	1	43	6	50
Sierra	-	4	-	4
Sequoia	-	1	-	1
Totals	272	191	27	490

On the basis of a broad appraisal of factors that prevailed during the 1954 season in central and southern California we doubt if the rust samples from the Stanislaus and Yosemite are blister rust. These factors, as outlined in a memorandum of November 15, 1954 to T. H. Harris, are: variability in laboratory rechecks of the rust samples showing a blister rust reaction, the scattered distribution of the rusted bushes due to the lack of long-distance spread of blister rust from pine to ribes during the spring of 1954, and the failure to find cankers in the Stanislaus and Yosemite areas where the rusted ribes (blister rust reaction in laboratory test) were found. It is strongly felt therefore that the ribes in these two areas were infected with pinyon rust and not blister rust. Nevertheless these areas should be watched closely in the future as the possibility that the ribes might be infected with blister rust cannot be completely discounted.



Several new pine infection centers were located within the rust zone but none was found south of the previously established line of spread. Of interest was the Fiddle Creek center (dis-

NEW INFECTION CENTERS  
FOUND ON PINE

covered by the Tahoe blister rust control personnel) on the Tahoe National Forest. The center, established several years ago, now extends along Fiddle Creek for about two miles and reaches the ridge top in a few places. Here is a good example of how the rust, under favorable conditions and when left unmolested, will spread out of the high rust hazard areas into the medium rust hazard areas. This is one of the few places in the Sierra sugar pine belt where the rust is extremely active and where it has attained an epidemic proportion. There are thousands of cankers yet remaining in this center which, unless removed, will continue to jeopardize the uninfected sugar pine stands to the south.

The Fiddle Creek center is one of two centers (the other the Wildcat Creek center on the Plumas) that has shown the rapid damage that is characteristic of the rust farther north and in other regions. Other new centers on the Tahoe that had originated as long ago as 1944 showed few if any new cankers. These centers were only a few miles distant from the Fiddle Creek center and illustrate that the rapid buildup of the rust at the Fiddle Creek center is an exception rather than a common occurrence.

Other pine infection centers of interest are: (1) One located within 300 feet of the top of Black Butte near Mt. Shasta City. Two trees--one a western white pine and the other a whitebark

BLISTER RUST FOUND ON PINE  
IN LASSEN VOLCANIC  
NATIONAL PARK

pine--were found to support multiple cankers. As far as can be determined this is the first time rust has been reported on whitebark pine in California. (2) One located beside Kings Creek in Lassen Volcanic National Park. One small sugar pine tree was found by the Lassen blister rust control personnel to be infected with three cankers. This is the first time an infected pine has been found within the Park boundaries.

In addition to the pine infections just mentioned, a ribes infection of interest was found in the Eel River drainage of the western Mendocino National Forest. Only one lightly infected bush of Ribes cruentum was found, but the rust sample was identified as blister rust.



# RUST RESISTANT WHITE PINES

The search for rust-resistant western white- and sugar pines continues. The group of 12 to 15 canker-free western white pine trees at Bohemia Mt. on the Umpqua National Forest are still

free of cankers. Cones from a few of these trees were collected by the Oregon blister-rust project for testing. The seven rust-resistant sugar pines being watched in California still are free of cankers: one tree has had a 1944-origin canker removed.

The following tabulation giving the known spread of white pine blister rust in California by years shows no further southward extension of the rust zone in the Sierra Nevada or Coast Range for the past two years.

By The Year	Spread in Miles From Oregon Border by Area by Host			
	Sierra Nevada		Coast Range	
	Sugar Pine	Ribes	Sugar Pine	Ribes
1936	-	-	4	6
1937	-	120	4	125
1938	-	160	4	125
1939	-	160	14	125
1940	107	160	42	125
1941	165	160	42	200
1942	165	175	42	210
1943	165	175	115	265
1944	165	240	115	265
1945	165	240	115	265
1946	204	240	115	265
1947	212	240	121	310
1948	212	240	121	310
1949	224	240	121	310
1950	231	240	121	310
1951	244	244	121	310
1952	244	244	121	310
1953	264	264	121	310
1954	264	264	121	310

## Disease Survey 1954.

The disease survey studies being conducted at the Mill Creek plot on the Rogue River National Forest of Oregon and at the Goat Creek plot on the

Lassen National Forest of California were continued during the 1954 field season.

A crew of three men working out of the Union Creek camp made a disease survey of the pine growing on the 126-acre segment of the Mill Creek plot from which the ribes were removed in

MILL CREEK PLOT

1953. A 5% sample was made. This work was performed in the south-west portion of the second 20-chain protective strip. In addition this crew ran strips in the area outside of the control unit, to the west of the Mill Creek plot, to determine the status of the ribes population that exists thereon. This was done in an effort to locate a possible source of sporidia that might be infecting the pine growing inside the plot. Since a hazardous spore source has not yet been located, further search should be made to the south and west of the plot.

Another wheel plot (No. 6) with 8 spokes was completed. The hub of the plot was centered at two somewhat isolated bushes of Ribes lobbi. The spokes of this plot were 1/2 chain wide and 15 chains long. Each spoke was divided into 30 transects each 1/2 chain on a side, or 1/4 square chain in area (1/40 of an acre). Data were recorded by transects.

SIXTH WHEEL PLOT  
COMPLETED

Bushes of R. cereum have been found to be highly resistant to blister rust. Occasionally a bush is found which has a few leaves lightly infected. In these cases the infection is nearly

RIBES CEREUM DAMAGE PLOT

always confined to the large succulent leaves that grow only on "new shoots." During the summer of 1954 the blister rust supervisor of the Rogue River National Forest found one comparatively large R. cereum that was heavily infected. This bush was growing in a western white pine stand and the young trees in the immediate vicinity supported numerous cankers. At the request of the Rogue River National Forest a plot was established to determine the amount of damage caused by this one highly rust-susceptible bush of R. cereum. A circular plot with a two-chain radius was established. One-half chain more was added to the 45° sector just south of east.

The trees were mapped by number and in the meantime each tree was thoroughly examined for cankers. When cankers were found they were



aged and recorded by tree number. The tree height, crown class, and other data were recorded in code so they could be transferred directly to punch cards for summarization on the International Business Machine. There was a heavy concentration of infected trees within the first half chain from the rusted bush and then there was a sharp decrease in both the number of cankerous trees as well as in the number of cankers. A complete report on the findings of this plot will be made later.

# GOAT CREEK PLOT

A three-man crew, quartered at California's Division of Forestry fire station at Burney, continued work on the Goat Creek plot. A thorough job of ribes eradication was performed on the

remaining unworked 16 acres. Then a 10% sample of the infectious conditions existing on the young trees of sugar pine within the 63.4-acre buffer zone was made. This disease survey was made by random sampling and involved 254 plots. Since logging had occurred on a portion of the area worked in 1953 (previous to ribes eradication work) numerous ribes seedlings were appearing along the skid trails. Most of these were removed during the last week of the season in an effort to keep the ribes live stem down below the danger level. The following tabulation shows the results of ribes eradication on the Goat Creek plot.

## SUMMARY OF THE RIBES DATA - GOAT CREEK PLOT - 64.4 ACRES 1953-1954

Year or Class	Ribes by Species			Number In- fected	Feet of Live Stem	Ribes by Age Group (Years)				
	Roezli	Neva.	Total			1-2	3-5	6-8	8+	Total
1954	635	62	697	148	1,070	400	59	21	217	697
Seedlings										
1954	5,538	341	5,879	-	980	5,879	-	-	-	5,879
Total										
1954	6,173	403	6,576	148	2,050	6,279	59	21	217	6,576
Total										
1953	3,818	267	4,085	941	7,396	614	2,139	467	865	4,085
Grand Total	9,991	670	10,661	1,089	9,446	6,893	2,198	488	1,082	10,661



Five of the one-acre disease survey plots were examined for ribes or pine infection. Ribes eradication work had been completed on the Big Canyon Creek plot of the Eldorado

ONE-ACRE DISEASE SURVEY  
PLOTS

National Forest late in 1953 and on the Buckhorn Lodge (Burney area) plot during early 1954. The number of ribes and amount of live stem were ascertained for these plots following the protective treatment. Since the areas in which the Snag Creek and Woodruff Creek plots are located are to be worked by eradication crews in 1955, the ribes were checked in 1954. The Mill Creek plot was checked for ribes and pine infection in 1954. A summary of the pine infection data (by plots) that was collected in 1954 appears in the following tabulation.



# SUMMARY OF THE 1954 DISEASE SURVEY PINE INFECTION DATA<sup>1/</sup>

State	Name of Plbt Sample	Acres in	Trees by Species									
			Sugar Pine			Western White Pine				Total		
			In-fected	Nonin-fected	Total	In-fected	Nonin-fected	Total	In-fected	Nonin-fected	Total	Cankers
Ore. <sup>2/</sup>	Ribes cereum	1.345	-	-	-	164	783	947	164	783	947	952
	Snag Creek One-Acre	1.00	-	-	-	47	800	847	47	800	847	64
	Woodruff Cr. One-Acre	1.00	-	-	-	27	303	330	27	303	330	45
	Mill Creek One-Acre	1.00	78	344	422	-	-	-	78	344	422	130
	Mill Creek 126-Acre	6.425	308	2,456	2,764	-	-	-	308	2,456	2,764	520
	Wheel No. 6	3.00	233	2,023	2,256	-	-	-	233	2,023	2,256	397
	Subtotal	13.77	619	4,823	5,442	238	1,886	2,124	857	6,709	7,566	2,108
Calif. <sup>3/</sup>	Goat Creek 64.4-Acre	6.35	237	655	892	-	-	-	237	655	892	782
Grand Total		20.12	856	5,478	6,334	238	1,886	2,124	1,094	7,364	8,458	2,890

1/ All data recorded in code and transferred to punch cards for summarization on I. B. M.

2/ All plots on Rogue River National Forest.

3/ In Lassen (Burney) area.

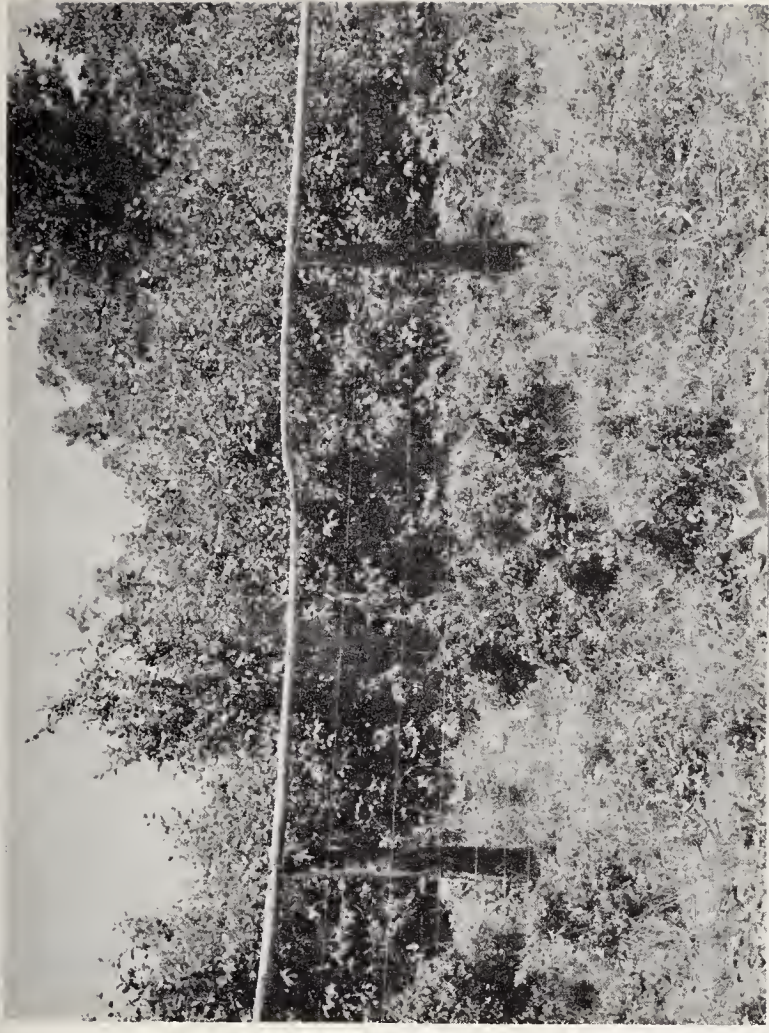








B-304. Chowchilla Mt. exclosure in 1941, shortly after establishment, Sierra N.F.



B-390. Big Bar Mt. exclosure, five years after fencing, Plumas N.F.



B-178. Very large gooseberry on Blue Canyon plot, almost crowded out of good pole stand, Sierra N.F.



B-493. Innumerable ribs of great vigor on Blue Canyon plot, three years after fire, Sierra N.F.









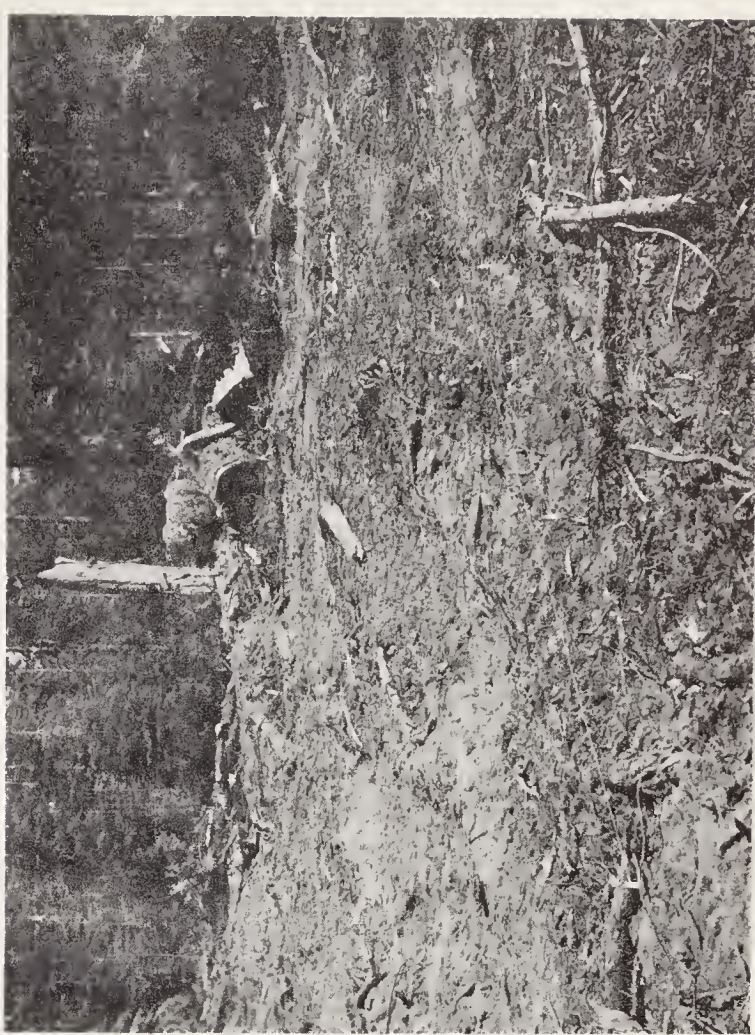
B-426. Sugar pine regeneration and ribes in knee-high bear-clover, Pilot Peak plot, Sierra N.F.



B-459. Small regeneration plot on logged area of relatively low site-quality, northeast of Humbug Valley, Lassen N.F.



B-598. Portion of Big Bar Mt. denuded ("brush-off") plot, shortly after establishment, Plumas N.F.



B-485. Mechanically denuded clearcut area back of Landing #6, Dodge Ridge Experimental Forest, Stanislaus N.F.











UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

Region 6

BR  
REPORTS  
Annual 1954  
(Pacific Northwest Region)

Portland, Oregon

ANNUAL REPORT OF BLISTER RUST CONTROL

IN THE PACIFIC NORTHWEST REGION

1954



By: C. P. Wessela  
Agriculturist





### Highlights of 1954

#### The Control Problem

Since its introduction into British Columbia in 1910, the white pine blister rust disease has spread over the entire range of white pines in the Pacific Northwest. Within the commercial range of western white pine and sugar pine in Oregon and Washington, this destructive fungus disease has developed to the extent that growing either of these two valuable timber trees is not possible unless control measures are undertaken. The problem presented is twofold. First, if sugar pine or white pine are to be grown for commercial timber crops, area must be selected where it can be grown profitably despite the handicap presented by blister rust. Secondly, stands on area selected must be protected, a task accomplished by eradicating the carrier host plants, gooseberries and currants, growing in that area.

#### Size and Location

With the exception of 4,500 acres in Mt. Rainier National Park in the State of Washington, all control of blister rust in the Pacific Northwest Region is confined to southern Oregon. Here the Forest Service and the Bureau of Land Management have selected about 140,000 acres for intensive white pine management. This area supports enough young pine to justify control costs or has the potential to produce profitable crops of western white or sugar pine despite the cost of blister rust control. In Crater Lake National Park, a 3,500-acre stand of white-bark pine is being protected for its aesthetic value and for its value as a soil stabilizer.

#### Status of Control

Initial coverage to eradicate ribes from area selected thus far for control of the disease is 97 percent complete. In addition, much of it has been covered for a second or third time. On this area the control job from here on out will be largely one of following logging operations or other disturbances to the forest soil caused as a result of placing control area under intensive forest management. Disturbances to the forest soil often set off a cycle of ribes regeneration requiring another series of eradication treatments. Once this surge of regeneration has been suppressed and the soil stabilized by a growing crop of young trees, the control job is completed except for periodic inspections to determine conditions following burns, salvage logging, road building, thinnings, etc.

Whether control will be established on additional area in Oregon and Washington depends on the results of experimentation with methods of reproducing and growing sugar pine, on the interest and attitude of private owners, and on the development of cheaper methods of securing control.



## Organization of Control Work

As a result of a reorganization of the U. S. Department of Agriculture, responsibility for coordinating and for providing leadership and technical direction to the blister rust program on a national scale was transferred on January 1, 1954, from the former Bureau of Entomology and Plant Quarantine to the Forest Service. West-coast work was divided on the boundary between the California Region and the Pacific Northwest Region. In the regional office in Portland a section was set up in the Division of Timber Management to handle the staff work connected with these responsibilities. In addition, two men were transferred to the Forest Service from the staff of the former Bureau of Entomology and Plant Quarantine. One was assigned to the supervisor's staff on the Rogue River National Forest to assist in the handling of control work on that forest and adjoining areas. The other worked on both the Umpqua and Siskiyou National Forests and adjoining areas to assist forest supervisors of those two forests. With these assignments forest supervisors on the Rogue River, Umpqua, and Siskiyou thus became responsible for providing leadership, technical direction and coordination to all blister rust control programs within the zone of influence of their respective forests, regardless of land ownership or the agency doing the work. In addition, they became responsible for the administration of blister rust work done on national forest land.

## Cooperation with Other Agencies

During 1954, memoranda of understanding between the Forest Service, the Oregon State Board of Forestry, and the Oregon State Department of Agriculture were brought up to date and in line with the reorganization of responsibilities. Cooperative working arrangements were also established with the Bureau of Land Management and with the National Park Service for providing leadership, technical direction, and assistance on their respective control programs. To date, no work has been done on state and privately owned lands other than that done to protect adjoining federal land.

## Accomplishments During 1954

Combined efforts of all agencies resulted in the destruction of ribes on 16,400 acres. Systematic surveys showed that an additional 4,300 acres were free of ribes and not in need of eradication treatment at this time. (Detailed results of 1954 ribes eradication work by each agency are contained in Table 2, page 12.) This coverage was adequate to keep the rust under control in heavily stocked young growth and in plantations. In addition, required progress toward permanent ribes suppression was made.

Coordinating ribes eradication schedules with cutting and planting programs so as to meet pathological and ecological needs continued to be a problem which received much attention. Explaining the problem to timber management assistants and forest managers has helped. Further improvement is anticipated on national forest lands as the blister rust program is meshed into the administrative structure of each national forest.

Some progress was made toward getting urgently needed research underway. A start was made on a project designed to develop a strain of sugar pine resistant to damage from blister rust; a study was initiated to determine the growth rate of blister rust cankers on sugar pine in varying environments in southern Oregon; and fungicides were sprayed on sugar pine stock at regular intervals in Wind River Nursery to learn the effectiveness of standard commercial fungicides in preventing infection of nursery stock. In addition, the Blister Rust Control Methods and Development Unit at Berkeley, California, established several plots in the South Umpqua Experimental Forest to learn the ecology of ribes indigenous to that territory.

#### Spread and Development of the Rust

Over most of southern Oregon, temperatures were abnormally low through most of the summer, and rainfall was heavier than usual. Such conditions normally produce heavy infection and development of blister rust on ribes, but for some reason infection on ribes was light. One reason advanced is that warm weather in April caused cankers to start sporulating before ribes leaves were developed. Subsequently, very cool weather set in, causing spore production to decrease markedly and in some places to cease. Full production of aeciospores never did take place later. For these reasons, there is a good possibility that despite seemingly ideal weather conditions, 1954 may not turn out to be a year when widespread pine infection took place.

#### Recommendations

High on the list of problems of blister rust control administrators is how to recognize and measure in a practical way the factors or conditions which influence the development and behavior of blister rust. In places where the rust has been present for ten to fifteen years, measurable differences in its behavior, not explained by the number of species of ribes present, are evident within relatively small areas. Obviously, a given number of ribes of a given species does not produce the same amount of damage in all sites. Some method of recognizing and measuring the factors which are responsible for these differences would enable administrators to reduce costs by varying the degree to which ribes must be suppressed commensurate with hazards.

Basic research to determine a practical method of measuring the factors which influence the behavior of blister rust is recommended for immediate action.



Siskiyou: Work on national forest land on this forest was financed by the Bureau of Land Management. The organization and administration of this project are described in the accompanying report covering that agency's blister rust control activities.

### Accomplishments

Rogue River: Ribes were eradicated from 3,074 acres, all but 32 acres of which was reeradication work. An additional 2,150 acres were examined by sampling procedures and found to meet standards without requiring eradication treatment. About 40% of the work done was accomplished through the contracting method. The remainder was done by specially trained force account crews on areas and in special conditions where contract procedures were not practical or more economical. Treatment of five-needled pine plantations falls in this category and occupied a large part of the force account crew's time. In the same category is maintenance work usually done by a well-trained and experienced team of three men.

A pine inventory started four years ago was practically completed. Two men covered approximately 13,000 acres. This inventory of five-needled pine stocking by size classes sets up values on a comparative basis and thereby serves as a basis of priority for and intensity of control treatment.

Special projects worked on include the examination of three proposed timber sale areas outside of present control boundaries in the Union Creek District and the inspection of several areas where no control work has been done in the Butte Falls District. In the Union Creek District, five-needled pine were being considered for planting in clearcuts, or the desirability of protecting advanced reproduction or poles was under consideration. Only one was considered worthy of further study, and that was on the basis of good stocking of uninfected poles. In the Butte Falls District, one area of about 480 acres was found to support enough natural uninfected sugar pine poles to warrant further appraisals.

Umpqua: Ribes were removed from a total of 798 acres and by sampling methods an additional 1,617 acres were found to be ribes free, making the total treated area 2,415 acres. Of this total, 687 acres was initial work, and 1,728 acres reeradication work. About 70 percent of the acreage from which ribes were removed was done by the contract method. The remaining worked area and that determined to be free of ribes was done by the camp crew.

Not all of that portion of the South Umpqua Experimental Forest set aside for the management of sugar pine supports an adequate stocking of sugar pine reproduction at the present time. An inventory of sugar pine stocking was started two years ago. This year the job was finished. Future ribes eradication efforts will be concentrated on those portions of the forest where the better stands of sugar pine reproduction occur.

Initial ribes eradication was completed on the South Umpqua Experimental Forest (part of the former Coffee Pot Unit) in 1948. A post-check of this unit was completed in 1954 and no large or heavy populations of ribes were found. The check did indicate a very light and scattered population. To



learn the effectiveness of the initial work and to locate spots requiring attention, checkers sampled the smaller-size classes of sugar pine (up to 12 feet in height) for rust infections occurring since 1948. Approximately 2,700 sugar pines were examined, of which 3% had been infected since 1948.

Gridding the South Umpqua Experimental Forest, Zinc Creek Units #2 and #18, and Junction Springs Unit #1 was completed. This consisted of establishing an index grid by marking corners of 5 chain squares with stakes and metal reference tags. Where silvicultural and control work are so intensively conducted, this grid system has proved to be of great value.

Siskiyou: Accomplishments on national forest land on the Siskiyou are covered in the accompanying Bureau of Land Management report of blister rust control activities.

#### Resume of Work Planned for 1955

Rogue River: Plans call for the employment of an eighteen-man force account crew to be quartered at the Union Creek Project Camp. In the Union Creek District this crew will be used to do needed reeradication work on five-needled pine plantations, to clean up scattered spots of stream-type work, to do required post and regular checking, and to administer a small contract program. Altogether, about 2,500 acres will be covered by force account crews and about 1,700 acres is scheduled for treatment by the contract method.

Men from the Union Creek crew will be used to do a pine inventory and appraisal of a 480-acre unit in the Butte Falls District. If values are sufficient, a ribes survey will be done and required ribes eradication work contracted.

In addition to conducting work on national forest land, Rogue River blister rust personnel will provide leadership and technical direction to a project in Crater Lake National Park and to a Bureau of Land Management project involving the protection of two sugar pine plantations adjacent to the forest. Necessary checking work on these projects will be done by personnel from the Union Creek Camp on a reimbursement basis.

Umpqua: About 1,200 acres will require treatment to keep abreast of ribes regeneration on areas already worked once and to do initial work on an area seed spotted to sugar pine in the fall of 1954. About 500 acres will be contracted; the remainder will be worked by a force account crew of six men.

Siskiyou: Work to be done on national forest land on the Siskiyou will be handled by the Bureau of Land Management. A resume of work to be done in 1955 is covered in the section of this report dealing with that agency's blister rust control activities.





## The Bureau of Land Management Program

### Size and Location of Program

A total of 98,419 acres are included in blister rust control units for which the Bureau of Land Management has assumed the responsibility of conducting required control work. About 90,000 acres lie in ten units in the vicinity of Grants Pass, Oregon near or within the Siskiyou National Forest. The remaining 8,400 acres is in two widely separated units. One called the Beaver Creek Unit is located about midway between Ashland and Klamath Falls, Oregon, in the vicinity of Chinquapin Mountain; the other, known as the Evans Creek Unit, is located near the southwest tip of the Umpqua National Forest.

Ownership of land is mixed. Oregon and California revested land grants within these units total 51,710 acres and public domain amounts to 1,717 acres; intermingled with them are 27,746 acres of national forest land and 1,240 acres of controverted land. The remaining 16,006 acres is state and privately owned, all of which is in protection zones treated to protect adjoining federal land.

### Status of Control

Initial work has been completed on 96 percent (94,294 acres) of total area in control units. In addition, required reeradication work has been done since the inception of the program in 1940. At the present time, 26 percent (25,231 acres) of area treated initially is on maintenance.

Barring unforeseen disturbances to the forest soil, this control project should continue at approximately its present rate of activity through 1958. Complete reworking of all units will have been finished by that time, unit boundaries adjusted, and maintenance acreage at least doubled. Unless new sugar pine units are added or cutting programs in present units accelerated, control work required will drop off rather sharply after 1958.

### Organization and Administration of 1954 Program

General project supervision was provided by a Bureau of Land Management superintendent attached to the Medford District Forester's staff. Technical direction and leadership were furnished by the blister rust staff man attached to the Umpqua National Forest supervisor's staff. Through a special reimbursement arrangement between the Bureau of Land Management and the Forest Service, the Siskiyou National Forest headquarters hired and payrolled temporary personnel and purchased supplies.

A force account crew of 13 men including a cook and foreman was employed to do ribes eradication work, checking, and contract administration. Quarters were provided in a camp located on the Rogue River about 14 miles west of Grants Pass, Oregon. Two contractors handled all contract work on the project.

Because of adequate allotments of control funds and the checkerboard pattern in which national forest land and O&C land grants lie in some units, the Bureau of Land Management has financed control work on all federal land in them since 1940. This policy was continued through 1954.

#### Accomplishments

A total of 12,866 acres were covered principally by the checker-flanker force account crew to eradicate ribes. Of this area, 2,039 acres was initial coverage, while the remaining 10,827 acres was covered to perform required reeradication of ribes regeneration. With the exception of the initial working of a sugar pine plantation adjoining the southwest tip of the Umpqua National Forest, practically all work was confined to the Selma and Pickett Creek Units south and west of Grants Pass, Oregon.

A type of disease survey was done by checker-flanker teams to sample rust development in the Selma and Pickett Creek Units. Samples of all sugar pine trees under 12 feet in height were inspected for blister rust infections which might have occurred since the last time ribes were removed. Less than 1/2 of one percent of the 33,000 trees examined were found to have been infected since the last time ribes were eradicated. Effective control appears to have been established on these two units.

#### Resume of Work Planned for 1955

A twelve-man camp will be established early in April at what is known as Hansen Saddle about 10 miles west of Galice, Oregon. Men from this camp will be used to post-check as much of the Bunker Hill-Chrome Ridge and Peavine-Rum Creek Units as possible in addition to eradicating scattered light populations of ribes. Extensive concentrations of ribes located by the post-check will be eradicated by the contract method. Two sugar pine plantations will require treatment; reeradication work will have to be done on the Evans Creek planting, and initial work will be required to protect plantings in the Beaver Creek Unit. A total of about 25,000 acres is scheduled for treatment, about one-half of which is Oregon and California revested land grants and one-half national forest land.



BR  
REPORTS  
Annual, 1954  
(Pacific Northwest Region)

## The National Park Program

### Size and Location

National Park blister rust control projects in the Pacific Northwest Region are located in Crater Lake and Mt. Rainier Parks. At Crater Lake a small unit of 3,632 acres encompassing Cloud Cap and adjoining area has been set up to protect a stand of white-bark pine. In Mt. Rainier, 4,500 acres are retained in control status in three separate units; two units support western white pine and the third contains both western white and white bark pine.

### Status of Control

Initial work has been completed on all national park control area in Oregon and Washington. At Crater Lake, 3,371 acres or 93 percent of control area is on maintenance; at Mt. Rainier, 3,580 acres (79 percent) is considered to be in the same status. This leaves 261 acres at Crater Lake and 920 acres at Mt. Rainier requiring future reeradication treatment. Other work required will consist of a maintenance coverage at 5 to 10-year intervals. The ribes suppression job on the Cloud Cap Unit in Crater Lake is well along toward completion. In Mt. Rainier, ribes regeneration is much more prolific and working conditions much more difficult. Nevertheless, good progress toward ultimate suppression of ribes has been made.

### Organization and Administration

No work was done at Crater Lake during 1954.

A small project was operated from late June to early September at Mt. Rainier. A crew of four eradicators and a foreman was hired and subsisted themselves in camp buildings at White River entrance. Administration and general supervision were done by the park staff. Leadership and technical direction was furnished through periodic inspections and reviews made by a man from the regional office of the Forest Service located at Portland, Oregon.

### Accomplishments

A total of 13,000 ribes were removed from 184 acres in the White River Unit. Working conditions were difficult. Topography is steep, ground cover is dense, and ribes are quite small. These factors all tended to slow the reeradication job.

On days when weather was too wet to do ribes eradication work, the crew cut cankers from infected pine in an effort to prolong the life of stands where infection had occurred prior to adequate ribes eradication.



## Resume of Work Planned for 1955

Work accomplished on Mt. Rainier Units during the 1954 season fell short of schedules. To complete the required rework on the White River Unit and to do the post checking work needed to prepare for the 1956 job on the Longmire and Silver Forest Units, a nine-man crew will be needed in 1955. It should be composed of a foreman, a checker, and seven eradicators. With a crew of this size and composition, reeradication activities and maintenance work will be put back on schedule. Anything less is not recommended.

A small program of maintenance work is needed on the Crater Lake Unit during 1955. Since the Forest Service will have a sizeable blister rust control project in operation on the adjoining Rogue River National Forest, it is recommended that arrangements be worked out to have men from that project do the Crater Lake job on a reimbursement basis. The entire job should not cost more than \$500.

TABLE I

STATUS OF RIBES ERADICATION BY OPERATING AGENCY  
AND LAND OWNERSHIP IN THE PACIFIC NORTHWEST REGION

AS OF DECEMBER 31, 1954

Control Operation	: Land : Owner- : ship	Acres Control Area				Initially Wkd:Required Future Work			
		: In White:	: In Pro-	: In	:	: In-	:	: Maint.	
		: Pine Mgt:	: tecton:	: Control:	: Acres	: Per-	: itial:	: Reerad:	: Work
		: Units	: Zone	: Unit	:	: cent	: Acres:	: Acres	: Acres
FOREST SERVICE									
Umpqua	: Nat.For:	5,110:	1,567:	6,677:	5,089:	76	:1,588:	4,106:	983
	: Contro.:	160:	365:	525:	525:	100	: -	: 525:	-
	: Total	: 5,270:	: 1,932:	: 7,202:	: 5,614:	: 78	:1,588:	: 4,631:	: 983
Rogue River	: Nat.For:	56,745:	-	: 56,745:	56,745:	100	: -	:44,083:	12,662
	: Private:	-	: 2,764:	2,764:	2,764:	100	: -	: 2,764:	-
	: Total	: 56,745:	: 2,764:	: 59,509:	: 59,509:	: 100	: -	:46,847:	:12,662
Total Forest Service	: Nat.For:	61,855:	1,567:	63,422:	61,834:	98	:1,588:	48,189:	13,645
	: Contro.:	160:	365:	525:	525:	100	: -	: 525:	-
	: Private:	-	: 2,764:	2,764:	2,764:	100	: -	: 2,764:	-
	: Total	: 62,015:	: 4,696:	: 66,711:	: 65,123:	: 99	:1,588:	:51,478:	:13,645
BUREAU OF LAND MANAGEMENT									
Medford District	: O&C	: 49,105:	2,605:	51,710:	49,623:	96	:2,087:	34,606:	15,017
	: P.Dom.	: 1,463:	254:	1,717:	1,677:	98	: 40:	467:	1,210
	: Nat.For:	26,112:	1,634:	27,746:	27,346:	99	: 400:	24,033:	3,313
	: Contro.:	1,240:	-	: 1,240:	1,240:	100	: -	: 1,240:	-
	: Private:	-	: 15,369:	15,369:	13,771:	90	:1,598:	8,080:	5,691
	: State	: -	: 637:	637:	637:	100	: -	: 637:	-
	: Total	: 77,920:	: 20,499:	: 98,419:	: 94,294:	: 96	:4,125:	:69,063:	:25,231
NATIONAL PARK SERVICE									
Crater Lake	: N.P.S.	: 3,632:	-	: 3,632:	3,632:	100	: -	: 261:	3,371
*Mt. Rainier	: N.P.S.	: 4,500:	-	: 4,500:	4,500:	100	: -	: 920:	3,580
	: Total	: 8,132:	-	: 8,132:	8,132:	100	: -	: 1,181:	6,951
ALL AGENCIES									
Regional Totals	: O&C	: 49,105:	2,605:	51,710:	49,623:	96	:2,087:	34,606:	15,017
	: P.Dom.	: 1,463:	254:	1,717:	1,677:	98	: 40:	467:	1,210
	: Sub.Tot:	50,568:	2,859:	53,427:	51,300:	96	:2,127:	35,073:	16,227
	: Nat.For:	87,967:	3,201:	91,168:	89,180:	98	:1,988:	72,222:	16,958
	: Contro.:	1,400:	365:	1,765:	1,765:	100	: -	: 1,765:	-
	: Sub.Tot:	89,367:	3,566:	92,933:	90,945:	98	:1,988:	73,987:	16,958
	: N.P.S.	: 8,132:	-	: 8,132:	8,132:	100	: -	: 1,181:	6,951
	: Tot.Fed:	148,067:	6,425:	154,492:	150,377:	97	:4,115:	110,241:	40,136
	: Private:	-	: 18,133:	18,133:	16,535:	92	:1,598:	10,844:	5,691
	: State	: -	: 637:	637:	637:	100	: -	: 637:	-
	: G.Total:	148,067:	25,195:	173,262:	167,549:	97	:5,713:	121,722:	45,827

\*In State of Washington





TABLE 2

## SUMMARY OF RIBES ERADICATION IN THE PACIFIC NORTHWEST REGION

1954

Agency	Control Operation	Class of Work	Worked	Acres		Total	Days	Thousands of Ribes Destroyed		
				Checked &	Meeting					
									Standards	Without
<hr/>										
WORK DONE IN OREGON										
Forest Service	Umpqua	:Initial	: 307:	380:	687:	113:	2			
		:Reerad.	: 491:	1,237:	1,728:	416:	29			
		:Maint. W.	: - :	- :	- :	- :	-			
		:All	: 798:	1,617:	2,415:	529:	31			
	Rogue River	:Initial	: 32:	- :	32:	19:	2			
		:Reerad.	: 2,332:	2,150:	4,482:	1,014:	146			
		:Maint. W.	: 710:	- :	710:	109:	3			
		:All	: 3,074:	2,150:	5,224:	1,142:	151			
	All Forest Service	:Initial	: 339:	380:	719:	132:	4			
		:Reerad.	: 2,823:	3,387:	6,210:	1,430:	175			
		:Maint. W.	: 710:	- :	710:	109:	3			
		:Total	: 3,872:	3,767:	7,639:	1,671:	182			
Bureau of Land Management	Medford	:Initial	: 1,645:	394:	2,039:	298:	52			
		:Reerad.	:10,701:	126:	10,827:	1,087:	20			
		:Maint. W.	: - :	- :	- :	- :	-			
		:Total	:12,346:	520:	12,866:	1,385:	72			
All Work In Oregon		:Initial	: 1,984:	774:	2,758:	430:	56			
		:Reerad.	:13,524:	3,513:	17,037:	2,517:	195			
		:Maint. W.	: 710:	- :	710:	109:	3			
		:Total	:16,218:	4,287:	20,505:	3,056:	254			
<hr/>										
WORK DONE IN WASHINGTON										
N.P.S.	:Mt. Rainier	:Reerad.	: 184:	- :	184:	181:	13			
<hr/>										
ALL WORK DONE IN PACIFIC NORTHWEST REGION (OREGON AND WASHINGTON)										
Total		:Initial	: 1,984:	774:	2,758:	430:	56			
		:Reerad.	:13,708:	3,513:	17,221:	2,698:	208			
		:Maint. W.	: 710:	- :	710:	109:	3			
		:Total	:16,402:	4,287:	20,689:	3,237:	267			



TABLE 3

## SUMMARY OF ERADICATION BY CONTRACT

## PACIFIC NORTHWEST REGION - 1954

	:	:	Acres	:	:	:	Average			
	:	:	Worked	:	:	Thousands	Price Per			
Control	:	:	by	:	:	of Ribes	Acre Paid To			
Operation	:Agency		Contractor	: Man Days	:	Destroyed	: Contractor			
ALL WORKINGS (INITIAL AND REERADICATION)										
Umpqua	:	FS	:	563	:	365	:	30	:	\$5.67
Rogue River	:	FS	:	1,236	:	338	:	47	:	5.66
Total	:	FS	:	1,799	:	703	:	77	:	5.66
Medford	:	BLM	:	573	:	207	:	56	:	5.73
Total	:	All	:	2,372	:	910	:	133	:	5.68
Accumulative Totals	:		:	49,082	:	13, 785	:	1,083	:	\$4.85
1946 - 1954	:		:		:		:		:	
	:		:		:		:		:	





# **WHITE PINE BLISTER RUST CONTROL**

**REGIONS SEVEN and EIGHT**

**CALENDAR YEAR 1954**



**UNITED STATES DEPARTMENT OF AGRICULTURE**

**FOREST SERVICE**





WHITE PINE BLISTER RUST CONTROL IN THE EASTERN REGION

ANNUAL REPORT FOR 1954

United States Department of Agriculture

FOREST SERVICE

Region 7

Upper Darby, Pa.



## TABLE OF CONTENTS

Foreword	<u>Page</u>
SECTION A - SUMMARY	
Statement of the Problem .....	1
Purpose of the Program .....	1
Values involved.....	2
Cooperation.....	2
Status of Program.....	3
Accomplishments during 1954 .....	4
Leadership .....	4
Ribes Eradication.....	4
Special Control Work .....	4
Surveys .....	4
Informational and Service Work .....	5
Changes in Financing .....	5
Changes in Organization .....	5
Changes in Distribution of the Pest .....	7
Field Investigations .....	7
Recommendations .....	7
SECTION B - GENERAL STATEMENT	
White Pine - Importance and Value .....	9
Disease and damage .....	10
Leadership Coordination and Technical direction .....	13
Organization Chart .....	Opposite Page. 14
Information and Service Work .....	14
State and Local Cooperation .....	15
Cooperation With Other Agencies .....	16
Control Accomplishments - All ownerships .....	17
Surveys .....	17
Ribes Eradication .....	18
Nursery Sanitation .....	19
Use of Chemicals .....	22
Checking .....	22
Methods Improvement .....	23
Canker Elimination .....	23
Status of the Work .....	23
The Continuing Problem .....	24
Control Accomplishments on State and Private Lands	
During 1954.....	24
Surveys.....	24
Ribes Eradication .....	25
Status of the Work .....	25
Control Accomplishments on National Forests During 1954.....	26
Surveys.....	26
Ribes Eradication.....	27
Status of the Work .....	27





## TABLE OF CONTENTS (Continued)

	<u>Page</u>
Control Accomplishments on National Parks - 1954.....	28
Surveys .....	28
Ribes Eradication .....	28
Status of Control .....	28
SECTION C - STATISTICAL TABLES .....	29
Table - 1 - Informational and Service Activities - 1954....	30
Table - 2 - Local Cooperation on Blister Rust Control Work.	31
Table - 3 - Surveys During 1954.....	32
Table - 4 - Ribes Eradication on All Lands During - 1954...	33
Table - 5 - Ribes Eradication on State & Private Lands During - 1954.....	34
Table - 6 - Ribes Eradication on National Forests During 1954.	35
Table - 7 - Ribes Eradication on National Parks During 1954..	36
Table - 8 - Maintenance Work During 1954.....	37
Table - 9 - Status of Control, By States and Districts.....	38
Table -10 - Status of Control, By State & Ownership.....	39
Table -11 - State and Local Cooperative Expenditures and Contributed Services During 1954.....	40





## FOREWORD

This report relates to activities during the calendar year 1954 in the control of the white pine blister rust disease in the Eastern Region comprising 18 states; namely, Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, West Virginia, Tennessee, Kentucky, Georgia, North Carolina and South Carolina.

The program is operated by the Forest Service of the United States Department of Agriculture, in cooperation with the department or agency in each state having statutory responsibility for the control of the disease, and with other federal land-owning agencies. As of January 1, 1954, the problem involved the effective and efficient destruction of ribes on a net control area of 17,765,919 acres, for the protection of the white pine on 7,238,103 acres.



Statement of the Problem

The white pine blister rust disease was accidentally introduced into the Northeastern States about 1900. Since then, the fungus has spread throughout the range of white pine in this region. The rust has been found in every state except Kentucky and South Carolina, and probably is already there. Progress of infection in areas where control has not been established clearly indicates that young white pine stands cannot be brought to maturity in the presence of ribes (currant and gooseberry bushes), the alternate host plants without which the disease cannot spread.

Eight species of native ribes and many cultivated varieties are found in the Eastern States. Distribution of the bushes throughout most of the Region varies in density from scattered individual plants to large concentrations. Ribes seed stored in the forest duff may remain viable for many years and bring about regeneration of these plants in areas disturbed by logging, fire, wind and other factors. Eradication of ribes is accomplished by uprooting the plants or killing them with chemicals such as 2,4,5-T.

Throughout its commercial range from Maine to Georgia, white pine is an important component of the forest. In many sections of New England, eastern New York, Virginia and North Carolina it is the most important forest tree and over large areas comprises the entire forest. White pine is a favored species in forest management, and has been used extensively in reforestation.

White pine is a natural resource which contributes to the welfare of the region and the nation, economically, aesthetically and in watershed protection, irrespective of ownership. The blister rust problem was created by nature, and the cost of control is to a large extent dictated by the natural distribution of ribes. Present owners of young white pine stands, the timber crop of the future, have little incentive to invest money in protection knowing that financial benefits will not accrue during their lives. Because of the complexities of the problem, and the fact that loss of white pine would affect everyone, protection of this resource is largely a public responsibility.

Purpose of the Program

The purpose of the program is to establish and maintain control of the disease in white pine stands that show promise of sufficient value at maturity to warrant the cost of control



measures. Selection of stands to be protected is based on quantity, quality and age of pine. In the Eastern region nearly seven and a quarter million acres of pine are designated for protection, approximately 60% of the total in the United States. About 15% of this pine is federally-owned. Most of the remainder is distributed among more than 222,000 private owners. The control area (pine and protection zone), on which the ribes population is to be kept at a minimum until maturity of the trees is assured, covers approximately 17 2/3 million acres.

The immediate objective is to bring at least 90% of the control program in this region to a maintenance basis by 1956. Once established, control can be maintained indefinitely at comparatively small cost.

#### Value Involved

The present and potential stumpage value of white pine in the control area of this region is estimated at more than 800 million dollars. The contribution this tree makes to the scenic and recreational advantages of the areas in which it grows is probably of equal value.

The total direct and indirect costs of all phases of the control program to all agencies to date plus the estimated costs to 1968 represent 3.8% of the present and potential value of the white pine in the control area, or a regional average cost of 8.3 cents per pine acre per year.

#### Cooperation

The blister rust control program in the Eastern region is an outstanding example of cooperative effort against a plant pest. More than half the entire cost of the control project on state and private lands, not including expenditures on emergency relief programs, has been assumed by states and local cooperators. Since 1918, over 43,000 pine owners have contributed \$528,210, towns \$1,197,884, counties \$265,725 and states \$5,032,627. In 1954 12 states, 19 counties, 199 towns, and 3 individuals spent \$327,898 on control activities.

The Forest Service, Park Service and Indian Service have borne the complete cost of control operations on federally-owned lands.

The U. S. Department of Agriculture has provided leadership, technical direction and coordination to the entire program. In addition, the Department has paid part of the cost of cooperative control work on state and private lands.

Cooperation with foresters and other conservationists in public and private employment is steadily increasing. There is much to be accomplished. It is important that the blister rust problem be recognized and given consideration in the management of white pine both from the standpoint of timber production and control of the disease. Efforts to bring this about will be continued.

### Status of Program

As of October 1, 1954 the control area in the Eastern Region totaled 17,666,460 acres including 7,239,777 acres of white pine meeting standards for protection. Control had been established on 84.2% of the control area and partial control on an additional 14.4%.

Under some conditions, control is established in one operation. In most cases one or more additional workings at 5-year intervals are needed to reduce the ribes population to the required minimum. Control can then be maintained through examination at less frequent intervals to locate and destroy any menacing development of ribes.

The size of the control area is not static since timber harvest, fires, wind storms, natural reproduction and planting of white pine frequently make reductions or additions necessary. Disturbances caused by fires, logging and wind often favor ribes regeneration and growth which may become a menace if not promptly suppressed. Examination of control areas prior to scheduling of ribes eradication work enables necessary adjustment of boundaries and location of danger spots. Particular need for this preliminary step exists in the Northeastern States where, because of the small units of ownership, man-made changes are more generally distributed and occur with greater frequency. As the maintenance phase of the program approaches, examination work by trained personnel becomes of increasing importance in keeping protection costs to a minimum.

Initial ribes eradication work is still needed on 1.4% of the control area, or 247,527 acres and about 2½ million acres require examination and necessary rework prior to meeting maintenance status. The 14,879,853 acres now on maintenance will need examination at 5 to 10-year intervals. Experience indicates that intensive ribes eradication work will be needed on about 15% of this acreage in order to maintain control. Detailed mapping of approximately one million acres of control area is needed, largely in New Hampshire. There will be a continuing need in all states for some revision of present control area maps to facilitate planning and execution of future control operations. Good maps aid materially in limiting control effort to the minimum required.



At the present rate of progress, control will be established on 90% of the control area by 1956. As control operations are constantly being extended to protect new areas of white pine, there is little possibility of ever having more than 90% of the program on a maintenance basis. The blister rust disease cannot be eradicated. Therefore, control must be maintained as long as successive crops of white pine are desired.

### Accomplishments during the Year

#### Leadership

Over-all leadership, planning, coordination, technical and supervisory service were rendered through a Forest Service staff of trained workers to almost two hundred fifty cooperating agencies conducting control operations on federal, state and privately-owned white pine lands in 12 states. As many as 429 seasonal workers were employed at the peak of the ribes eradication season.

#### Ribes Eradication

During the 1954 field season, 620,089 acres were cleared of 3,436,161 wild and cultivated ribes by 22,185 man days of labor. In addition 378,960 acres of the area on maintenance were examined for ribes and found to be in need of no additional control measures at this time. The area on maintenance increased by 457,090 acres, or 3%, as a result of 1954 control activities.

#### Special Control Work

Sanitation work for the protection of white pine reforestation stock was performed in the environs of 7 nurseries in Connecticut, New York, North Carolina and Pennsylvania. Canker elimination work, to save pines with high aesthetic value, was restricted to state and municipally-owned lands in 8 towns in New York.

#### Surveys

In preparation for ribes eradication work 1,154,435 acres of control area were examined to determine need for mapping and/or to determine ribes conditions. This resulted in a net reduction of 99,459 acres of control area and an increase of 1,674 acres of white pine. Initial mapping was performed on 147,663 acres and remapping on 521,280 acres. Surveys outside the control area to locate new areas of white pine covered 1,018,015 acres. Time spent on surveys totaled 7,312 man days, mostly during the fall and winter months.



## Information and Service Work

Informational and service activities by the leadership personnel involved attendance at local meetings, including participation in the deliberations of state forestry organizations, State Forest Practice Boards, Pest Control Committees and Soil Conservation District Committees. Scripts for local news items and radio broadcasts were prepared. Demonstrations were arranged and displays shown at agricultural fairs and meetings. The motion pictures continued to be an important adjunct to informational work.

Service activities included thousands of personal interviews and follow-up calls, and instructions were given in the field to many individuals. Instructions were given to students in forestry schools and to practicing foresters, to enable them to more readily identify the disease, recognize the importance of blister rust control and the salvaging of infected pines, and to bring to their attention the advantage of cutting practices which keep ribes suppressed.

The effectiveness of informational and service activities is reflected in the local cooperation secured in 1954.

## Changes in Financing

Financing of the blister rust control project was transferred from the Bureau of Entomology and Plant Quarantine to the Forest Service as of January 3, 1954. As of July 1, 1954, financing of operations in the states of Tennessee, North Carolina, South Carolina and Georgia became the responsibility of Region 8, although technical direction and general supervision of these operations remain with Region 7. New memoranda of understanding were effected between U.S.F.S. Region 8 and the States of North Carolina and Tennessee. New memoranda of understanding were also effected between the Forest Service and all states in Region 7 where blister rust control operations are in progress during fiscal year 1955.

## Changes in Organization

Permanent federal personnel on the project decreased from 39 to 34 during 1954.

C. C. Perry, who for more than 30 years provided able leadership to the blister rust control program in Massachusetts and in recent years served as Control Specialist, retired in January 1954.

The services of W. J. Schreier, district leader in Connecticut were terminated April 30, 1954 because of a required reduction in force.

T. P. Woolschlager, district leader at Boonville, New York, retired June 30 after 29 years in Government service.

E. C. Filler who had been in charge of the blister rust control program in the northeast for more than 35 years retired June 30 prior to the transfer of the regional headquarters of the project from Greenfield, Massachusetts to the U. S. Forest Service regional office at Upper Darby, Pa.

Claire A. Purcell, former secretary at the regional office was transferred November 29, 1954 to become a secretary to the Chief of the Division of BRC at the Washington office.

Rose Krainson, clerk at the Greenfield, Massachusetts office transferred to the Soil Conservation Service at Amherst, Massachusetts July 1.

Clerical work of the blister rust control section is now handled by the clerical staff of the Division of State and Private Forestry.

Gradual reorganization of the project during the year resulted in the abolishment of four district offices located at Stafford Springs, Connecticut; Boonville, New York; Kingston, New York and Williamsport, Pennsylvania. All BRC activities in Connecticut are now supervised by Alton V. Miller, Collaborator. Two districts in New York and one in Pennsylvania have been enlarged; the Boonville district has been added to the Gloversville district of J. W. Charlton, the Kingston district has been added to the Saratoga district of P. E. Barber and the Williamsport district has been added to the Harrisburg district of R. P. Fatzinger.

V. C. Lilley was transferred from the Williamsport district of Pennsylvania to Greenfield, Massachusetts. He now supervises all BRC activities in that State.

Blister rust control has now been fully integrated with Region 7, U. S. Forest Service. On July 1, 1954, William Clave became Chief and Glenn R. Allison, Assistant Chief of the Section of BRC in the Division of State and Private Forestry.

Fred U. Sievers, formerly district leader at Kingston New York was promoted to area leader in New York February 1. On July 1 he was assigned as leader of Areas II and III including Vermont, Massachusetts, Connecticut and New York.



## Changes in Distribution of the Pest

In the Eastern Region, control of the disease has advanced to the point where extensive damage to white pine is not developing. Limited areas of heavy infection on pine are noted, particularly where there has been a delay in re-working disturbed areas to protect white pine reproduction. Infection on pine was found for the first time in Lebanon County, Pennsylvania September 28, 1954. A new center of infection on white pine was located at Stratton Meadows on the Cherokee National Forest in Monroe County, Tennessee. The oldest cankers originated in 1945. To the best of our knowledge this is the southern-most occurrence of the disease on white pine in the eastern U.S. A canker of 1949 origin was found in Babcock State Park, Fayette County, West Virginia in 1954. This is the first pine infection reported in this County.

## Field Investigations

Field investigations in the development of more effective use of 2,4,5T in eradication of native gooseberry bushes were continued in 1954. Considerable success has been obtained through increasing the proportion of 2,4,5T in the spray solution from 3/4 to 1 gallon per hundred gallons of water. The thoroughness of application appears to have considerable effect on results.

An infection study is being conducted in towns of southeastern New Hampshire to determine damage caused by concentrations of *R. hirtellum* growing in grassy swales. Early attempts to eradicate these bushes proved costly and not too effective. In a few of the towns where ribes growing under these conditions have constituted the only blister rust control problem no eradication work has ever been performed.

In 1953 several species of native ribes were treated with CMU, applied in powder form at the base of the bush. Only a few of the bushes were dead in 1954, the remainder showed little effect of the chemical.

Tests to determine the effectiveness of maleic hydrozide in killing gooseberries were started in Virginia. The State Forest Service provided the chemical.

## Recommendations

1. That the allotment of federal funds for leadership of the blister rust control program in Regions 7 and 8 be sufficient to maintain the present organization through fiscal year 1956.



2. That \$125,000 of federal funds be allotted to Region 7 for control operations on state and private lands during fiscal year 1956. State and local agencies are annually contributing more than three times that amount.

3. That special effort be made to find means of modernizing the blister rust control transportation equipment to the point where it can be included in the regular Forest Service budget for equipment operation, repair and replacement.

4. That every effort be made to strengthen the program in Maine, New Hampshire, Vermont, Maryland, Virginia and West Virginia through increased participation by state and local agencies.

5. That in both Maine and Vermont a minimum of three men qualified for appointment as supervisory control aid be employed on a permanent basis and paid from state or federal funds. Such field workers are essential to the program, especially for maintenance operations.

6. That the need for records and reports required at each level of operation from the Washington office to cooperating towns be reviewed in the interest of reducing project paper-work.

7. That uniform terms be adopted by all regions to designate blister rust control operations which are similar in objective.

8. That the four areas of the region be reduced to three by combining present Area III with Area II and changing the designation of present Area IV to Area III.

9. That the Northeast Forest Experiment Station investigate the importance of white pine to the economy of Region 7.

10. That the Northeast Forest Experiment Station undertake studies in ribes ecology designed to solve some of the problems connected with ribes suppression work.

## SECTION B

### GENERAL STATEMENT

#### White Pine

##### Importance and Value

Wherever it grows, from Maine to Georgia, eastern white pine is important to the local economy. In the forest it is noted for its tolerance to site, rapid growth, ability to reproduce, response to management and aesthetic value. White pine is favored for lumber production and in recent years has been in demand for pulp. The wood is soft, straight-grained and easily worked. Thousands are employed in the harvesting of white pine and in manufacturing plants wholly or partially dependent upon this species. Most of the production goes into building lumber, boxes and crates. White pine is used widely in boat building and in the manufacture of knotty pine paneling, coffins, reels, woodenware, toys and novelties. Better grades are used in making foundry patterns, shade-rollers, drawing boards, dowels and furniture. The Federal Reserve Bank of Boston has estimated that in the New England States alone the processing and marketing of various forms of white pine wood add nearly 80 million dollars to the annual income of these states.

The nearly  $7\frac{1}{4}$  million acres of white pine in the aggregate control area in the region represent 60% of the total pine acreage in the United States designated for protection from blister rust. Extensive areas of valuable white pine, growing in pure stands or in mixture with hardwoods and other conifers, are located in southern Maine, southern New Hampshire, north-central and southeastern Massachusetts, eastern New York and in parts of the mountainous sections of Virginia, West Virginia, North Carolina, Tennessee and north-west Georgia. Less extensive stands (5 to 50 acres) are scattered throughout most of New England, New York, Pennsylvania and the southern Appalachian states.

The volume of mature pine amounts to over 10 billion feet with a stumpage value of \$145 million. The immature pine should at maturity produce another 64 billion feet worth \$665 million. From 1911 to date the average annual production of white pine in the Eastern region has been approximately 600 million feet, with heavier production in the first ten years and in the past fifteen years of the period. Project leaders report sales of white pine stumpage in 1954 at prices varying from \$8 to \$40 per thousand feet. The average was in the vicinity of \$16.



The contribution of white pine to the recreational advantages of the areas in which it grows and to watershed protection is difficult to evaluate. Obviously these trees add much to the attractiveness of many of the vacation resorts of the region and to the scenic backgrounds of the highways traveled by thousands of tourists annually.

While cutting of white pine has been heavy during the past 15 years, the values mentioned above are being renewed to a large extent through natural reproduction of this species in cut-over areas and in abandoned fields and pastures. Over the past several years statistics have indicated a gradual but rather steady reduction in the acreage of white pine considered worth protection. The net reduction since 1950 has been 78,000 acres, or slightly over one percent. In 1954 a net increase of 1,674 acres is recorded. Reports of increasing amounts of natural reproduction being brought into the control area have come from most field personnel in New England, Virginia, North Carolina and Tennessee. From Maine to Tennessee the possibility of increasing white pine acreage through forest management is tremendous. On thousands of acres, good white pine reproduction exists under stands of inferior hardwoods or in competition with hardwood reproduction. Service foresters are stressing this possibility and are encouraging owners to release the pine. There is need for greater effort along this line.

#### Disease and Damage

The disease was accidentally introduced into the Northeastern States at the turn of the century on imported white pine planting stock. By 1915 it had spread to native white pine and soon became rather generally distributed. The disease has been found in every county of the New England States, New York and Pennsylvania in which white pine is an important native species. There is abundant evidence of the destructiveness of the disease in the Northeastern States. Studies of selected areas in Maine, New Hampshire, Vermont and New York showed 45 percent of the pines dead or certain to die. In recent years service foresters in New York and New Hampshire have reported stands of mature pine in which 30 percent or more of the trees must be salvaged immediately or lost because of the presence of old blister rust cankers which originated before control was established. According to a report of twenty years of management of the Charles Lathrop Pack Demonstration Forest at Warrensburg, New York released in 1949, 25% of the white pine cut was infected with cankers which originated prior to control activities. An estimated volume of some half a million board feet was salvaged by the cutting operations.



Prompt salvage operations could minimize loss from blister rust in many other mature and nearly mature stands in the northeast. As an indication of what a delay of as little as five years can mean in loss resulting from old blister rust cankers the following is quoted from a report by Allen W. Plumb, Resident Forester of the Blue Mountain Forest Association, Plainfield, New Hampshire:

The following study of blister rust damage was made during the months of September and October 1953 on the so-called Corbin Park of the Blue Mountain Forest Association in the town of Plainfield, N. H.

The area comprised 19.5 acres of pure pine which evidently seeded in naturally on old farm land, after the property was purchased by Austin Corbin about 1890. From stump count, age of the trees varied from 35 to 75 years. Part of the area would be considered a very good pine site.

During the summer of 1948, the stand was marked for selective cutting, trees being designated for removal with a marking axe. All merchantable trees infected with blister rust were blazed, along with other undesirable stems, to combine a salvage with an improvement cut. Restrictions were placed on the area, however, for game management reasons, and the operation was not conducted that year. After evaluating benefit to the game and loss in revenue from mortality, it was decided to re-mark the area in the fall of 1953 and conduct a partial cut.

It was during the process of re-marking that many trees which had been previously blazed were then found to be dead and beyond salvage. Thus a study was made to determine the actual volume which had been lost during the five intervening years. All trees were tallied by D.B.H. and merchantable height that were found to be dead, but were originally marked, indicating they were living five years ago.

A total of 147 trees were tallied on the 19.5 acres, containing 19,852 board feet. U. S. Forest Service form class 78 volume table was used in computation of volume. Average mortality was 7.5 trees and 1,018 board feet per acre. At an average stumpage of \$14.00 this represents a loss of \$14.25 per acre and a total of \$277.93 over the five year period.

Trees tallied ran from 8 to 28 inches D.B.H. and from 1 log to  $3\frac{1}{2}$  logs in merchantable height. It is interesting to note the greatest volume was from 8 to 16 inches, with 128 trees killed containing 13,149 board feet.

Under normal conditions most of these trees would have been left for growing stock. For the most part, infection was quite old and evidently had occurred on all trees at about the same time, thus in my opinion, mortality had reached its peak during the past five years.

In the late twenties and early thirties blister rust "flags", the tell-tale sign of newly developed blister rust cankers, were a common site on larger trees throughout most of the important white pine producing sections of New England and New York. Dead and dying trees, mostly in the reproduction or sapling stage, were obvious from the roadside for as long as they retained their discolored needles. This evidence of the disease has almost completely disappeared within the control area, except in very limited sections where it has not been possible to maintain an adequate schedule of ribes eradication work.

Plantings of imported infected stock in the Southern Appalachian area in the early part of the century were rather limited. Furthermore, control activities were started before the disease had gained much of a foothold. Consequently the disease has spread more slowly. Systematic surveys have revealed a serious ribes problem on only a small proportion of the total area in which white pine is important. Although heavy loss of reproduction on limited areas has occurred, particularly at higher elevations, real commercial damage has not been found in any sizable area.

At the present time, infection on pine is generally distributed in counties in western Maryland, eastern West Virginia, western Virginia, and in a few counties of western North Carolina. It has been found in two counties in Tennessee.

In the region as a whole, progress of control is so far advanced that no extensive new areas of heavy damage are being found within control areas. Of particular concern, however, is loss of natural white pine reproduction in cut-over areas when prompt application of control measures could save it. Such losses continue in sections where the control program is inadequately financed.

Infection on ribes in 1954 was reported as medium to heavy in all of New England, New York, Maryland and West Virginia. Light to medium infection was found in Pennsylvania and Virginia.



## Leadership Coordination and Technical Direction

Blister rust control work on state and private lands is the responsibility of local owners and the state agency designated by state law. On federal lands, the agency in charge of administering those lands is responsible for control of the blister rust disease. The Forest Service, in addition to being responsible for control work on National Forests, is charged with leadership, coordination and technical direction of the program on lands of all ownerships.

Technical direction is a two-fold task. Surveys to determine the spread and intensity of the disease and the damage to white pine are made by the Forest Service. The information is made available to all agencies for use in planning control activities. Rust behavior is an important consideration in establishing work priorities. The Forest Service also supplies direct, on-the-ground, technical assistance through area and district leaders. These men have been educated in the identification, habits and life history of the disease, and are specially trained in application of control measures. They are strategically located to carry on surveys, train field workers and assist state, federal and local agencies in conducting a control program.

Coordination is affected through general supervision of the control operations. Every effort is made to secure region-wide adoption and application of the most effective methods and techniques. Suggestions for improvements are encouraged and when found practicable are developed, tested and demonstrated. The most recent significant development has been in chemical eradication of ribes. It is now standard practice to treat concentrations of certain species with a solution of 2,4,5T. Better control at less cost has resulted. Through coordinated planning, reporting and record keeping the control project has become a unified effort, making more effective and economical use of trained personnel and equipment.

The Forest Service endeavors to fulfill its leadership responsibility by keeping land owners and the general public informed regarding the disease and the need for control, and by encouraging states and local agencies to participate in a cooperative control effort. Field investigations are made in the interest of increasing the efficiency and effectiveness of the program. Research in such things as rust behavior, ribes ecology and management of forest land so as to inhibit ribes regeneration and growth is recommended and encouraged. A study to determine the place of white pine in the forest economy of the region has been proposed.

The Lea Act, a law enacted April 26, 1940 (58 Stat. 168; 16 USC 594a.), authorizes the Department of Agriculture to cooperate with states and private individuals in the control



of blister rust. This is being implemented in Forest Service, Region 7 through the activities of 24 district leaders under the direction of three area leaders. A Blister Rust Control Section in the Division of State and Private Forestry directs the work at the Regional office level.

#### Informational and Service Work

Through informational and service activities the public has been kept fully informed and in most states has responded commendably in support of the control program. In contacts with forest owners BRC personnel stress the importance of good forest management and explain how management can influence ribes regeneration and growth.

During 1954, area and district leaders addressed 147 meetings attended by more than 6,000 individuals. Nineteen radio talks were broadcast in five different states. Newspapers were furnished with 135 informational items for publication, and 55 demonstrations were placed at fairs, meetings and other public gathering places. Blister rust films were shown on 52 occasions, reaching more than 7,500 individuals. Special courses of instructions were given to students at seven forestry schools. Most of the courses included both classroom and field instruction. Show-me trips arranged for pine owners, forestry-minded groups, and for town, county and state officials have made it possible for many people to obtain a better knowledge of the disease and control operations. The State Forester of West Virginia spent two days in the white pine areas of the eastern part of the state to gain first hand knowledge of the BRC problem. Foresters attending the fall meeting of Allegheny Section, the Society of American Foresters, were given an opportunity to observe blister rust on their field trip in Virginia.

Blister rust personnel participated actively in the meetings of Forest Practice Boards, Pest Control Committees, Soil Conservation District Committees and other groups interested in forestry and conservation. Mutually helpful contact has been maintained with practicing foresters - federal, state, county, farm, extension and consulting. Many of these men have cooperated in the control program by bringing blister rust to the attention of forest owners, aiding them in salvaging infected trees, recommending cutting practices that keep ribes suppressed and by encouraging town and county participation in the control effort.

District leaders initially interviewed 2,810 individuals and made 2,237 follow-up calls in connection with 1954 activities. Field instruction regarding the disease and control measures was given individually to 1,921.

See table 1 Section C for a summary of 1954 informational activities.

PERMANENT BLISTER RUST CONTROL PERSONNEL IN EASTERN REGION

REGIONAL FORESTER

R-7 DIVISION OF STATE & PRIVATE FORESTRY

SECTION - Blister Rust Control  
Section Chief - William Clave  
Asst. Section Chief - G.R. Allison

P. H. Simmonds  
Area Leader  
Maine - New Hampshire

District Leaders

H. G. Bradbury  
Belfast, Me.

M. G. Calderara  
Auburn, Me.

J. B. Pike  
Bridgton, Me.

S. H. Boomer  
Conway, N. H.

W. S. Codman  
Laconia, N. H.

S. D. Conner  
Keene, N. H.

R. E. Curtis  
Rochester, N. H.

*Ret.*  
L. E. Newman  
Concord, N. H.

*Ret.*  
G. F. Richardson  
Lebanon, N. H.

F. U. Sievers  
Area Leader  
Vt.-Mass.-Conn.- N. Y.

District Leaders

*transferred*  
M. R. Mulholland  
Rutland, Vt.

E. H. Palmer  
St. Johnsbury, Vt.

F. H. Rose  
Bellows Falls, Vt.

V. C. Lilley  
Greenfield, Mass.

A. V. Miller  
Collaborator  
Canaan, Conn.

P. E. Barber  
Saratoga Sprgs., N. Y.

J. W. Charlton  
Gloversville, N. Y.

N. H. Harpp  
Warrensburg, N. Y.

H. W. Holcomb  
Malone, N. Y.

*Hick*  
B. A. Beardsley  
Collaborator  
Oneonta, N. Y.

J. R. George  
Area Leader  
Pa. & So. App'l. States

District Leaders

M. J. Deberti  
Brookville, Penna.

R. P. Fatzinger  
Harrisburg, Penna.

G. S. Cramer  
Mt. Solon, Va.

SUPERVISORS  
M. Q. Miller  
Staunton, Va.  
C. A. Rodamer  
Harrisonburg, Va.

G. E. Keaton  
Lerona, W. Va.

SUPERVISORS  
C. M. Fultz  
Lost River, W. Va.  
D. L. Gillispie  
Arborvale, W. Va.

W. A. Stegall, Jr.  
Asheville, N. C.







## State and Local Cooperation

Individuals, private groups, towns, counties and states have participated in the control program. Of the 18 states in Forest Service Region 7 and 8, 12 took an active part in the 1954 program. No control work was needed this year in Rhode Island, New Jersey, Delaware, Kentucky, South Carolina or Georgia. The 12 states and their local cooperators contributed \$327,898, or 57% of all funds expended for blister rust control on state and private lands in 1954.

See tables 2 and 11, Section C, for summaries of state and local cooperation.

In the states of Massachusetts, Connecticut, New York, Pennsylvania, North Carolina and Tennessee blister rust control work is adequately financed. The program is rapidly approaching a maintenance basis. A reduction in annual expenditures has already been effected in several of these states. Work on state-owned lands in Maryland is adequately financed, but no state funds have been made available for work on privately owned lands. While the present acreage of privately-owned white pine is not extensive, there is much interest in planting of this species. Further consideration should be given to the problem of protecting privately-owned pine in Maryland.

In five states control work is not on proper schedule because of inadequate financing of the project. In order to complete the presently needed initial and rework within the next five years and at the same time maintain the control that has already been established on the remainder of the control area, additional funds in the following amounts are needed:

Maine . . . . .	\$40,000	Annually
New Hampshire . . . . .	17,000	"
Vermont . . . . .	6,500	"
Virginia . . . . .	10,000	"
West Virginia . . . . .	24,000	"

Following a five year program of this magnitude, annual expenditures in the above mentioned states could be reduced by 35 to 40 percent. In Maine, State Foresters and BRC personnel are making a concerted effort to increase both state and town contributions. Only 48 towns cooperated in 1954 as compared with 68 in 1953. This was to some extent due to uncertainty regarding the continuation of federal cooperation. An intensified information and education program is needed to increase town participation in blister rust control work.

In New Hampshire town cooperation is excellent. Although additional state funds are needed to speed up the program, a slight decrease is in prospect for 1955.

An increase in both town and state funds is needed in Vermont. The Vermont legislature appropriated funds for forest pest control work in 1954 and 1955. The funds have been used primarily for control of the gypsy moth and the forest tent caterpillar. It would be helpful if some of these funds could be made available for blister rust control in 1955.

The blister rust control program on state and private lands in Virginia is not up to schedule. At the present rate of financing from 15 to 20 years will be required to reach a maintenance basis.

The West Virginia Conservation Commission, State Forester, District Foresters and blister rust control personnel are making a concerted effort to inform forest land owners, civic groups and officials of the need for an expanded blister rust control program in the white pine growing areas of the state.

#### Cooperation with Other Agencies

Every effort is made to maintain good cooperative relations with all agencies interested in planting, growing or managing white pine. Information on ribes conditions as a guide in selection of white pine planting sites is offered and made available as requested. Service of this nature in connection with plantings recommended by Soil Conservation Service Farm Planners poses a problem in some localities. The plantings are usually small, frequently covering less than an acre, and are scattered over numerous farms in a district. From the control standpoint it would be helpful if white pine plantings were concentrated in larger blocks and at fewer locations. Such problems are being worked out locally through the cooperative effort of district leaders and conservation agents.

Work on National Park lands was in progress at four locations during 1954 - Saratoga Battlefield, Shenandoah National Park, Blue Ridge Parkway, and Great Smoky Mountain National Park. Control operations are up to schedule on these units. Examinations and work are being performed annually as needed. A survey of pine and ribes conditions on portions of Acadia National Park is recommended for 1955. No control work has been done there since the severe burn in 1947. Prior to the fire, control operations on this park had reached maintenance status.

Federal trucks were loaned to the Post Office Department at Auburn, Maine; Saratoga Springs, New York and Harrisonburg, Virginia during the Christmas mailing season.



Control Aide D. L. Gillispie was granted leave without pay for a period of four months to work on Oak Wilt control in West Virginia. His services were requested by E. Waldo Craig, State Entomologist. Mr. Craig has since expressed complete satisfaction with the work performed by Gillispie.

District Leader E. H. Palmer, St. Johnsbury, Vermont inspected several small shipments of Christmas trees to determine compliance with gypsy moth quarantine regulations. This service in cooperation with the Agricultural Research Service required only a day or two and was performed without reimbursement.

Aeciospores were collected at several locations and forwarded to Dr. Ralph L. Anderson at St. Paul, Minn. for research purposes.

### Control Accomplishments - All Ownerships

#### Surveys

The objectives of survey work are (1) to limit control areas to the minimum needed for adequate protection of white pine stands whose present or potential value will justify the cost of control, and (2) to determine current need for control work and most economical method of performing it. A map showing the location of the white pine stand and the control area boundaries is prepared for use in control operations. The fall and winter months are ideal for mapping work. Surveys to determine need for ribes eradication work are most effective in the spring months. Needed eradication work should be scheduled one year later so as to allow plenty of time for thorough planning and preparation. Proper choice of methods and equipment based on a knowledge of ribes conditions is important from the standpoint of costs. Under some conditions a trained scout can complete the work rapidly and economically. Portions of the control area may require systematic coverage by a crew. Chemicals may offer the best solution to the problem of eradicating large concentrations of certain species of ribes. Special tools and an extra supply of salt and borax may be needed to deal with large ribes.

In states where district leaders have had the assistance of a few well trained men employed throughout the year to complete the necessary surveys, fewer laborers have been required during the ribes eradication season. The result has been a more efficient and effective control program.

Control area examination, always essential prior to ribes eradication activities, is of increased importance in a maintenance program. In fact, it is the greater part of the job.



Intensive ribes eradication work is rarely needed in maintenance work, except in areas recently disturbed by logging, fire, high winds, etc. Periodic examination is necessary to detect the disturbed areas and to delimit portions where ribes regeneration has created a new hazard. Trained and experienced men accomplish this task at very small cost.

During 1954 a total of 1,154,435 acres of control area were examined and 668,943 acres were mapped. Total time required was 7,313 man days. Included in this activity was a maintenance examination of 421,097 acres which revealed that ribes eradication work was needed on only 10% of the area, or 42,137 acres.

See Table 3, Section C, for detailed breakdown of survey accomplishments.

The control area of the region was reduced by 99,459 acres as a result of the 1954 surveys. This, however, is the net change and does not indicate the many adjustments made. Actually 77,440 acres were added and 176,899 acres were discontinued. In some districts these adjustments have meant a considerable increase in the blister rust control problem. Much of the acreage was discontinued because hardwood replaced white pine following cutting operations. Very little work would have been needed to maintain control of the disease had the area remained in white pine. On the other hand, much of the acreage added represents new control area set up to protect natural white pine reproduction appearing in abandoned fields and pastures, or newly established plantations of this species. In many instances the initial work involves heavy populations of ribes and large bushes.

The hurricanes - Carol, Edna and Hazel - of 1954, have also increased the control problem. Soil disturbances resulting from wind-throw of individual trees or large groups of trees have occurred over a wide area. The disturbed spots are likely sites for ribes regeneration. More intensive examination of control areas will be required to locate such spots and determine whether or not ribes regrowth has resulted.

#### Ribes Eradication in 1954 - all Ownerships

Accomplishments in ribes eradication during the 1954 field season were gratifying. Intensive work was performed on 620,089 acres and 3,436,161 ribes were destroyed. An additional 378,960 acres on maintenance were examined and found to be in no need of intensive work at this time. This means that a total of 999,049 acres of control area was given

attention in 1954. As a result of this year's activities, 457,090 acres of control area were placed on maintenance. Control has now been established on 14,879,853 acres, or 84.2% of the control area - up 3% from 1953.

Labor was readily available throughout most of the region. Training was not much of a problem as many of the laborers and most of the foremen and crew leaders employed had had previous experience. Administrative work in connection with employment was more burdensome because of unfamiliarity with Forest Service procedures and the revised government security regulations.

Weather conditions variously affected the region's ribes eradication program. In the north, especially in Maine and the northern districts of New Hampshire, Vermont and New York frequent rains made working conditions disagreeable and caused some lost time. Virginia and West Virginia experienced a very dry summer. Here, lost time was not a problem, but hard, dry soil made hand-pulling of ribes more difficult. When a bad fire situation developed in West Virginia, some of the State blister rust control funds were diverted to fire suppression work.

See Tables 4 and 8, Section C, for additional data, relative to ribes eradication work on lands of all ownerships in 1954.

#### Nursery Sanitation

Ribes eradication was performed in the sanitation zones of seven nurseries located in four states. Eighty acres were initially worked and 3,063 acres were reworked. These nurseries contained an estimated 8.8 million white pine.

There are thirty-three nurseries in Region 7 and 8 producing white pine. Eleven of these are privately-owned, twenty-three are state-owned and one, a T.V.A. nursery, is federally-owned. Sanitation zones around most of these nurseries have been worked repeatedly. The problem of maintaining protection from blister rust is not a difficult one.

A list of the nurseries maintaining sanitation zones in the Eastern Region as of December 31, 1954 follows:







Acreage of  
Sanitation Zone

New Jersey

State Nursery - Washington Crossing, N. J..... 600

Pennsylvania

Clearfield State Nursery - Clearfield, Pa.....	370
Greenwood State Nursery - Petersburg, Pa.....	411
Mt. Alto State Nursery - Mt. Alto, Pa.....	366
Rockview State Nursery - Pleasant Gap, Pa.....	354
Howard State Nursery - Mt. Eagle, Pa.....	215
Andorra Nursery - Chester Hill, Pa.....	1,065
Fairview Nursery - Fairview, Pa.....	559
Doyle Nursery - Seven Stars, Pa.....	581
	<u>3,921</u>

Maryland

State Forest Nursery - Harmons, Md..... 560

North Carolina

N. C. State Forest Nursery - Penrose, N.C..... 100

Tennessee

TVA Nursery - Clinton, Tenn..... 300

Virginia

State Forest Nursery - Charlottesville, Va.... 200

West Virginia

State Forest Nursery - LeSage, W. Va.....	162
Parsons Nursery - Parsons, W. Va.....	651
	<u>813</u>

All States

33 Nurseries ..... 14,781

### Use of Chemicals

A solution of 2,4,5T sprayed on the leaves and stems has proved effective in killing two species of native ribes - R. glandulosum and R. americanum. Both species grow abundantly in the northeastern states and have been found at several locations in the Southern Appalachians. They commonly occur in dense concentrations and, when growing in the open, seed prolifically. They constitute a serious blister rust control problem in some districts in New England and New York.

During 1954, 1,890 acres of ribes were treated with 2,4,5T. This acreage is comprised of small areas on which ribes grew in concentrations. Most of the concentrations covered less than an acre each. When found in the course of regular eradication work, the concentrations are marked and left. The locations are noted on a map. Later a crew, properly equipped and trained in chemical eradication, sprays the bushes in a fraction of the time required to eradicate them by hand. Since 2,4,5T is not toxic to many of the other plants that form the ground cover, and since very little soil disturbance occurs in chemical eradication, there is much less chance of ribes regeneration. Very few seedlings have appeared on sites where concentrations of R. glandulosum were sprayed as long ago as 1950.

Field investigations are being continued in the search for dosages or methods of application of 2,4,5T that will be more effective in killing other species of ribes. Some measure of success has been attained in the treatment of R. hirtellum and R. cynosbati, but few of the tests have proven entirely satisfactory. R. hirtellum when growing in grassy swales is difficult to eradicate by hand methods. An effective chemical treatment would be of considerable value. R. cynosbati and R. rotundifolium generally occur as scattered bushes. Most of them can be easily uprooted by hand. Large specimens are readily disposed of by cutting or breaking off the bush at ground level and treating the exposed root crown with a dry mixture of salt and borax.

### Checking

Supervisory personnel make general inspection of worked areas and observe the functioning of the field units to make certain that proper procedures are being followed. A more formal type of check, the measured general check, is applied after work has been completed to ascertain whether or not the regional standard for satisfactory work - not more than 20 feet of ribes live stem per acre remaining - has been met.



## Methods of Improvement

Constant attention is given to means of reducing cost and increasing the effectiveness of control work. Among the notable accomplishments in this respect have been reduction in size of eradication crews, reduction in protection zone widths, the use of chemicals in ribes eradication, and reorganization of personnel. Special efforts have been devoted to increasing the efficiency of mapping and control area examination work. Close attention is being given to the training of scouts. Ribes populations over much of the control area have decreased to the point where effective control can be maintained by the use of scouting methods.

This year chemical treatment of scattered ribes through spraying with a solution of 2,4,5T was tried. Crew units were equipped with pressure type, back-pack spray tanks of two gallon capacity. Results appeared good even under conditions where considerable time was spent in searching for ribes. Further tests will be made in 1955.

Tests have indicated that a large ribes plant may be killed by attaching a two inch square of blotter paper impregnated with 2,4,5T concentrate to the root crown with a thumb tack.

## Canker Elimination

Canker elimination work, involving the pruning of infected limbs, removal of dead tops and surgical treatment of stem cankers, is confined to trees of high aesthetic value. In 1954, work of this nature was continued at public campsites maintained by the New York State Conservation Department and in city-owned plantations at Kingston, New York. Of the 10,293 trees examined, 1,991 were treated. Thirteen stem cankers and 2,976 branch cankers were removed. In addition, 2,108 fatally infected trees were marked for cutting.

## Status of the Work

In the 18 states of the Eastern Region the blister rust control area encompasses 17,666,460 acres including 7,239,777 acres of white pine. Control has been established on 84.2%, or 14,879,853 acres of the present control area. It is estimated that on five million acres of this no further control work will be needed.



The following table shows the distribution of white pine and control area by ownerships and affords some comparison as to status of control:

Ownerships	Acres of White Pine	Acres of Control Area	Percent of Control	
			Initially Worked	On Maintenance
State and Private Lands	6,145,637	15,725,575	98.5	82.8
National Forests	1,015,560	1,784,579	99.5	95.7
National Parks	78,558	155,861	100.0	98.2
Indian Lands	22	445	100.0	100.0
Total	7,239,777	17,666,460	98.6	84.2

Tables 9 and 10, Section C, list additional data relative to the status of control in the Region.

Control work on National Parks and National Forests is being performed as needed. This cannot be said, however, of the work on State and Private lands where by far the largest amount of pine and control acreage is located.

#### The Continuing Problem

Although excellent progress in control of the disease has been made, much remains to be done to insure adequate protection of the white pine resource of the region. The continuing problem is challenging. Future requirements include the performance of first work on 247,527 acres and rework on  $2\frac{1}{2}$  million acres. There is also the job of maintaining the control already established on an additional nine million acres. Examinations to locate disturbances that may have resulted in regrowth of ribes should be made at 5 to 10 year intervals. Examinations made to date indicate that ribes eradication work will be needed on less than 15% of the area examined. Men with training and experience in control operations and with competence of the highest order are needed to cope with the continuing problem. Continued effective cooperation must be maintained at Federal, State and local levels.

#### Control Accomplishments on State and Private lands

during 1954

#### Surveys

A total of 1,104,787 acres of control area was examined during 1954 in twelve states of the Region. Of this, 643,545 acres were



mapped. An additional 1,000,665 acres outside the control area were examined to locate and extend protection to recently established areas of white pine meeting standards of quantity and quality. Examination of 395,299 acres of the control area placed on maintenance more than five years ago revealed that only 38,242 acres were in need of intensive ribes eradication work. Lack of funds prevented the employment of sufficient men during the winter months to complete the survey work needed in Maine, Vermont, Virginia and two districts of New Hampshire. Constant attention must be given to improving survey methods so that this work can be accelerated without sacrificing quality or decreasing reliability of results.

#### Ribes Eradication during 1954 on State and Private Lands

Eleven states participated in ribes eradication work during the year. A total of 3,192,660 ribes were destroyed in working 600,881 acres of control area. Seventeen percent of the acreage was worked initially and the remainder was reworked.

In Maine and Vermont eradication activities were confined largely to towns that appropriated money for blister rust control, although considerable work is needed in other towns. Control work is up to schedule in most of the towns that have cooperated regularly. On the other hand, there are some towns in which little or no work has ever been done. The New Hampshire State law which makes it possible to compel a town to spend up to \$400 a year for ribes eradication work was invoked in a few instances in 1954. Nevertheless, in many towns, appropriations have not been large enough or frequent enough to adequately meet the job load. In Massachusetts, Connecticut, New York, Pennsylvania, North Carolina and Tennessee ribes eradication work was performed as planned and in accordance with established priorities. In Maryland, the work was entirely on state-owned lands. No ribes eradication work to protect privately-owned white pine has been carried on since the close of the emergency relief programs. Funds for control work on state and private lands in Virginia and West Virginia were not sufficient to accomplish all of the needed work. Natural reproduction of white pine is steadily increasing the values at stake. Additional survey work is needed to determine the control problem involved. No ribes eradication work was needed in 1954 on State and private lands in Rhode Island, New Jersey, Kentucky, Tennessee, Georgia or South Carolina.

Table 5, Section C, lists additional data relative to eradication work performed on state and private lands during 1954.

#### Status of the Work on State and Private Lands

Initial work in eradication of ribes has been performed on 98.5% of the 15,725,575 acres of control area set up to protect 6,145,637 acres of white pine on state and private lands in this region. Control has been established on 13,018,244 acres, or 82.8% of the total. The following tabulation shows the dis-



tribution of pine and control area by states, and indicates the status of control work.

State	Acres of White Pine	Acres of Control Area	Percentage of Control Area	
			Initially Worked	On Maintenance
Me.	893,586	2,250,481	95.1	66.5
N. H.	1,217,744	2,572,336	99.2	65.3
Vt.	177,003	732,105	91.3	72.2
Mass.	599,413	1,463,628	99.9	94.1
R. I.	64,018	147,778	100.0	100.0
Conn.	96,226	459,971	100.0	100.0
N. Y.	744,728	2,329,109	99.0	78.3
N. J.	3,771	16,742	100.0	100.0
Pa.	104,554	483,898	99.6	89.9
Del.	242	6,186	100.0	100.0
Ky.	31,199	114,312	100.0	100.0
Md.	70,718	164,474	100.0	92.7
Va.	558,180	1,533,535	98.9	94.6
W. Va.	242,817	621,742	99.9	82.5
Ga.	248,576	324,452	100.0	99.9
N. Car.	581,785	1,362,155	100.0	99.8
S. Car.	45,398	77,008	100.0	100.0
Tenn.	465,679	1,065,663	100.0	99.4
Total S&P	6,145,637	15,725,575	98.5	82.8

Additional data regarding the status of control activities are listed in the table 10, Section C.

#### Control Accomplishments on National Forests during 1954

##### Surveys

A total of 43,438 acres was examined on four National Forests - Jefferson, Geo. Washington, Cherokee and Pisgah - during the year, and 25,398 acres were mapped. All control area scheduled for work was examined prior to ribes eradication. Natural reproduction of white pine is making it necessary to increase control areas on National Forests. Some 4,500 acres were added on the Geo. Washington, 1,015 acres on the Jefferson and 155 acres on the Cherokee. Because white pine is being favored in forest management work, little decrease in control areas can be expected.

Maintenance examinations covered 23,533 acres. Of this, 3,785 acres required eradication work.



### Ribes Eradication on National Forests during 1954

A total of 152,496 ribes was destroyed in working 18,491 acres of control area during the year. Approximately one sixth of this was initial work, two-thirds was rework and one sixth was maintenance work. An additional 19,748 acres of the area on maintenance was found to be in no need of ribes eradication work at this time.

Table 6, Section C, lists additional data relative to ribes eradication work on National Forests in 1954.

#### Status of the Work

The control area set up to protect 1,015,560 acres of white pine on twelve national forests of Regions 7 and 8 amounts to 1,784,579 acres. Of this, 95.7% is on maintenance. Partial control has been established on an additional 3.8%. Initial work is needed on 8,049 acres.

The following table shows the distribution of white pine by forests and affords a comparison as to status of control.

National Forest	Acres of White Pine	Acres of Control Area	Percent of Control Area	
			Initially Worked	On Maintenance
White Mountain	2,000	5,379	100.0	89.2
Green Mountain	544	2,308	100.0	100.0
Allegheny	957	4,085	100.0	97.2
Geo. Washington	193,367	429,388	98.3	86.2
Jefferson	55,218	108,529	99.2	94.9
Monongahela	46,854	89,559	100.0	94.0
Cumberland	16,980	32,002	100.0	100.0
Pisgah	92,701	161,752	100.0	98.1
Nantahala	42,138	62,709	100.0	99.9
Cherokee	250,105	485,103	100.0	99.5
Sumter	18,794	53,862	100.0	100.0
Chattahoochee	295,902	349,903	100.0	99.9
Total	1,015,560	1,784,579	99.5	95.7

Table 10, Section C, lists additional data relative to the status of control.

## Control Accomplishments on National Parks - 1954

### Surveys

A total of 6,210 acres was examined on four National Parks during 1954. This included 2,265 acres of maintenance examination work. Two hundred forty-seven acres were examined at the Saratoga Battlefield National Monument, 2,265 acres in the Shenandoah National Park, 1,565 acres along the Blue Ridge Parkway and 2,133 acres in the Great Smoky National Park.

Work is up to schedule and examinations are performed as needed. Plans have been made for examination work at Arcadia National Park in 1955. No control work has been done there since the severe burn in 1947. Primary purpose of the examination is to determine status of white pine reproduction and ribes regeneration in the burned area.

### Ribes Eradication on National Parks during 1954

Ribes eradication work was performed on 717 acres of National Park land in 1954. A total of 91,005 ribes were destroyed most of which (80,894) were found on 110 acres of initial work in the Great Smoky National Park. On the Shenandoah National Park, 110 acres of ribes eradication was all that was needed to maintain control on an area of 2,265 acres.

Table 7, Section C, lists additional data relative to ribes eradication work on National Parks in 1954.

### Status of Control

All of the 155,861 acres of blister rust control area on National Park lands has been worked one or more times and 98.2% is on maintenance. Control work is on schedule. Periodic examinations are made and ribes eradication is performed as needed.

Table 10, Section C, lists data relative to the status of control on each National Park.

## S E C T I O N - C

## Statistical Tables





Table 1 - Informational and Service Activities of  
Blister Rust Control Leaders during 1954

State	Meetings Addressed		No. Radio Talks	No. Items Published	No. Demonstrat- ions Placed
	No.	Attendance			
Me.	12	284	1	5	7
N. H.	52	2,937	2	65	20
Vt.	19	395	9	21	10
Mass.	-	-	-	-	1
Conn.	2	43	-	-	1
N. Y.	48	2,590	1	34	6
Pa.	5	43	6	7	1
Va.	4	160	-	-	6
W. Va.	4	142	-	3	2
No. Car.	1	125	-	-	1
Total	147	6,719	19	135	55

Service Activities

State	No. Initial Interviews	No. Follow-up Calls	No. Individuals Instructed in Field
Me.	940	454	554
N. H.	461	843	236
Vt.	414	401	32
Mass.	16	3	8
Conn.	16	12	4
N. Y.	757	479	798
Pa.	114	15	130
Va.	57	15	87
W. Va.	35	15	72
Total	2,810	2,237	1,921

(Two show-me trips in Virginia)





Table 2 - Local Cooperation on Blister Rust ControlWork During 1954

State	No. of Cooperators			Amount Expended			
	Individ- uals	Towns	Counties	Individ- uals	Towns	Counties	Total
Me.	-	48	1	-	\$ 11,179	\$ 500	\$ 11,679
N. H.	1	110	-	571	36,199	-	36,770
Vt.	2	32	-	88	6,930	-	7,018
Mass.	-	-	-	-	-	-	-
Conn.	-	3	-	-	2,160	-	2,160
N. Y.	-	6	18	-	818	22,436	23,254
Total	3	199	19	659	\$ 57,286	\$ 22,936	\$ 80,881

Local Cooperation on Blister Rust Control Work1918 - 1954 Inclusive

State	Individual Cooperation		Town Cooperation		County Cooperation	
	No. Cooperators	Amount Spent by Individual Cooperator	No. Towns Appropriat- ions or Con- tributions	Amount Town Money Expended	No. County Appropriat- ions or Allotments	Amount Spent by Counties
Maine	11,132	\$ 86,110	1,436	\$ 261,397	2	\$ 601
N. H.	703	51,790	2,439	761,298	6	1,724
Vt.	2,387	77,641	425	92,502	-	-
Mass.	21,975	119,354	73	28,358	-	-
R. I.	8	581	-	-	-	-
Conn.	527	12,670	214	43,498	-	-
N. Y.	5,990	177,157	39	10,831	225	263,400
Pa.	303	2,273	-	-	-	-
Va.	1	276	-	-	-	-
W. Va.	1	358	-	-	-	-
Total	43,027	\$ 528,210	4,626	\$1,197,884	233	\$265,725



Table 3 - Surveys During 1954

State	Ownership	Acreage Within Control Area				Acres Ex- amined out- side Control Area	Total Man Days
		Examined for any Purpose	Initially Mapped	Remapped	Total Mapped		
Maine	S & P	139,761	15,932	112,597	128,529	140,975	844
N. H.	S & P	244,417	87,100	70,992	158,092	53,950	1,382
Vt.	S & P	75,965	9,880	20,449	30,329	171,451	195
Mass.	S & P	99,141	-	66,384	66,384	39,000	355
Conn.	S & P	31,043	-	30,059	30,059	77,832	129
N. Y.	S & P	332,302	27,700	173,546	201,246	138,327	3,177
N. Y.	Nat'l Park	247	-	-	-	-	-
Pa.	S & P	146,539	6,688	10,776	17,464	378,730	415
Md.	S & P	480	93	-	93	-	3
Va.	S & P	15,904	-	8,865	8,865	-	183
Va.	USFS	37,038	-	12,132	12,132	13,000	240
Va.	Nat'l Park	3,830	-	-	-	-	81
W. Va.	S & P	17,960	-	200	200	400	65
W. Va.	USFS	3,385	-	12,996	12,996	-	117
N. Car.	S & P	775	-	314	314	-	13
N. Car.	USFS	515	-	-	-	900	10
N. Car.	Nat'l Park	2,133	-	-	-	-	72
Tenn.	S & P	500	-	1,970	1,970	-	16
Tenn.	USFS	2,500	270	-	270	3,450	16
TOTALS	S & P	1,104,787	147,393	496,152	643,545	1,000,665	6,777
	USFS	43,438	270	25,128	25,398	17,350	383
	Nat'l Park	6,210	-	-	-	-	153
	All	1,154,435	147,663	521,280	668,943	1,018,015	7,313





TABLE 4 — RIBES ERADICATION ON ALL LANDS DURING 1954

STATE	FIRST WORKING			SECOND WORKING			OTHER PRE-MAINTENANCE WORKING			MAINTENANCE WORKINGS			ALL WORKINGS		
	ACRES	RIBES	MAN DAYS	ACRES	RIBES	MAN DAYS	ACRES	RIBES	MAN DAYS	ACRES	RIBES	MAN DAYS	ACRES	RIBES	MAN DAYS
ME.	7,003	22,231	117	56,631	171,740	1,023	66,523	183,294	1,161	102	10,431	29	129,659	387,696	2,330
N. H.	10,568	164,616	476	104,398	405,330	2,529	61,208	128,142	912	1,336	57,503	166	177,510	755,591	4,083
VT.	29,272	111,159	961	6,915	27,758	286	3,258	10,035	108	6,465	17,986	212	45,910	166,942	1,567
MASS.	10,199	47,542	102	21,394	81,557	364	18,024	38,777	297	802	9,380	57	50,419	177,256	900
CONN.	—	—	—	—	—	—	—	—	—	8,902	85,201	275	8,902	85,201	275
N. Y.	31,502	301,538	1,570	35,865	220,618	1,655	62,557	290,684	2,099	16,912	156,799	682	146,836	960,507	6,006
PA.	5,767	21,495	309	6,096	25,791	197	9,956	14,003	180	2,228	26,455	286	24,047	87,744	972
MD.	543	421,140	340	50	3,442	19	—	—	—	—	—	—	593	424,582	359
VA.	9,841	84,935	1,371	5,473	45,555	1,034	5,996	39,982	1,063	5,315	43,580	860	26,625	213,160	4,328
W. VA.	493	14,959	87	2,705	25,835	312	5,795	51,942	751	75	534	12	9,068	93,270	1,162
N. CAR.	110	80,894	176	—	—	—	255	343	5	—	—	—	365	81,237	181
TENN.	155	2,975	22	—	—	—	—	—	—	—	—	—	155	2,975	22
TOTAL	105,453	1,273,484	5,611	238,927	1,007,626	7,419	233,572	757,206	6,576	42,137	407,869	2,579	620,089	3,436,161	22,185

STATE	ACRES PER			PER ACRE VALUES		
	MAN	DAYS	PER	MAN	DAYS	RIBES
ME.	55.6	.018				3.0
N. H.	43.5	.023				4.3
VT.	29.3	.034				3.6
MASS.	56.0	.018				3.5
CONN.	32.4	.031				9.6
N. Y.	24.4	.041				6.5
PA.	24.7	.040				3.6
MD.	1.7	.605				716.0
VA.	6.2	.163				8.0
W. VA.	7.8	.128				10.3
N. CAR.	2.0	.496				222.6
TENN.	7.0	.142				19.2
TOTAL	28.0	.036				5.5





TABLE 6 -- RIBES ERADICATION WORK ON NATIONAL FORESTS DURING 1954

NATIONAL FORESTS	FIRST WORKING			SECOND WORKING			OTHER PRE-- MAINTENANCE WORKING			MAINTENANCE WORKING			ALL WORKING		
	ACRES	RIBES	MAN DAYS	ACRES	RIBES	MAN DAYS	ACRES	RIBES	MAN DAYS	ACRES	RIBES	MAN DAYS	ACRES	RIBES	MAN DAYS
JEFFERSON	140	3,412	35	129	1,397	19	662	1,926	77	666	20,207	152	1,597	26,942	283
GEORGE	2,230	19,168	541	4,144	29,555	854	4,858	33,691	866	3,044	9,148	460	14,276	91,562	2,721
WASHINGTON	493	14,959	87	--	--	--	1,895	15,524	308	75	534	12	2,463	31,017	407
(TOTAL	2,723	34,127	628	4,144	29,555	854	6,753	49,215	1,174	3,119	9,682	472	16,739	122,579	3,128
CHEROKEE--TENN	155	2,975	22	--	--	--	--	--	--	--	--	--	155	2,975	22
TOTAL	3,018	40,514	685	4,273	30,952	873	7,415	51,141	1,251	3,785	29,889	624	18,491	152,496	3,433

NATIONAL FORESTS	ACRES PER		PER ACRE VALUES	
	MAN DAY	MAN DAYS	RIBES	
JEFFERSON	5.6	.177	16.9	
GEORGE	5.2	.191	6.4	
WASHINGTON	6.1	.165	12.6	
(TOTAL	5.4	.187	7.3	
CHEROKEE--TENN	7.0	.142	19.2	
TOTAL	5.4	.186	8.2	



TABLE 7 - RIBES ERADICATION WORK ON NATIONAL PARKS DURING 1954

NATIONAL PARKS	FIRST WORKING			SECOND WORKING			OTHER PRE-MAINTENANCE WORKINGS			MAINTENANCE WORKINGS			ALL WORKINGS			ACRES PER MAN		PER ACRE VALUES	
	ACRES	RIBES	MAN DAYS	ACRES	RIBES	MAN DAYS	ACRES	RIBES	MAN DAYS	ACRES	RIBES	MAN DAYS	ACRES	RIBES	MAN DAYS	MAN DAY	MAN	DAYS	RIBES
SARATOGA																			
BTLFLD. N. Y.	-	-	-	-	-	-	247	9,132	18	-	-	-	247	9,132	18	13.7	.007	37.0	
BLUE RIDGE	-	-	-	-	-	-	250	892	56	-	-	-	250	892	56	4.5	.224	3.6	
SHENANDOAH	-	-	-	-	-	-	-	-	-	110	87	7	110	87	7	15.7	.064	.8	
GREAT SMOKY	110	80,894	176	-	-	-	-	-	-	-	-	-	110	80,894	176	.6	1.600	735.4	
TOTAL	110	80,894	176	-	-	-	497	10,024	74	110	87	7	717	91,005	257	2.8	.358	126.9	





Table 8 - Maintenance Work During 1954

State	Ownership	Total Acreage Examined	Acreage Worked	Number Ribes Destroyed	Total Man Days	Acres Worked Per Man Day	Per Acre Values	
							Man Days	Ribes
Maine	State & Private	74,332	102	10,431	29	3.5	.284	102.3
N. H.	" " "	62,173	1,336	57,503	166	8.0	.124	43.0
Vt.	" " "	8,845	6,465	17,986	212	30.5	.033	2.8
Mass.	" " "	21,390	802	9,380	57	14.1	.071	11.7
Conn.	" " "	31,043	8,902	85,201	275	32.4	.031	9.6
N. Y.	" " "	112,321	16,912	156,799	682	24.8	.040	9.3
Penna.	" " "	72,212	2,228	26,455	286	7.8	.128	11.9
Va.	" " "	12,700	1,495	14,138	241	6.2	.161	9.5
"	USFS	22,898	3,710	29,355	612	6.1	.165	7.9
"	Park Service	2,265	110	87	7	15.7	.064	.8
W. Va.	State & Private	283	-	-	-	-	-	-
"	USFS	635	75	534	12	6.3	.160	7.1
Total	State & Private	395,299	38,242	377,893	1,948	19.6	.051	9.9
R-7	USFS	23,533	3,785	29,889	624	6.1	.165	7.9
	Park Service	2,265	110	87	7	15.7	.064	.8
	Grand Total	421,097	42,137	407,869	2,579	16.3	.061	9.7





# STATUS OF ELISTER RUST CONTROL WORK IN PRESENT NET CONTROL AREA IN THE EASTERN REGION BY STATES AND DISTRICTS

SEPTEMBER 30, 1954

State	District	Total Control Area	Acreage of White Pine	Net Acreage Worked			Acreage in Control Area			Percentage of Net				Control Area						
				Pre - Maintenance			Now on Maintenance	Requiring No Further Work	Needing Further Attention		Worked		On Maintenance	Needing Further Attention						
				First	Second	Other			Maintenance	First Work	Rework	First		Second	Other	Maintenance	First	Rework		
Maine	Bradbury Calderara Pike	726,809	219,333	645,529	370,531	75,168	34,080	427,920	217,609	427,920	88.8	51.0	10.3	4.7	58.9	11.2	29.9	58.9		
		775,188	306,145	746,536	531,580	191,913	2,504	445,122	301,414	438,416	96.3	68.6	24.8	.3	57.4	3.7	38.9	56.6		
		767,661	372,368	767,661	636,317	228,799	15,600	641,670	125,991	555,184	100.0	82.9	29.8	2.0	83.6	-	16.4	72.3		
		Totals for State	897,786	2,159,726	1,538,428	495,870	52,184	1,514,712	109,932	645,014	1,421,520	95.2	67.8	21.8	2.3	66.7	4.8	28.5	62.5	
N. H.	Boomer Codman Conner Curtis Newman Richardsen	381,720	161,600	378,437	254,487	21,324	5,663	203,520	174,917	203,520	99.1	66.7	5.6	1.5	53.3	.9	45.8	53.3		
		268,735	176,958	268,735	244,836	74,630	18,324	251,144	17,591	251,144	100.0	91.1	27.8	6.8	93.5	-	6.5	93.5		
		707,819	351,219	707,819	613,272	155,164	19,507	601,835	105,984	601,835	100.0	86.6	21.9	2.8	85.0	-	15.0	85.0		
		605,159	295,246	299,695	20,061	6,817	312,361	2,203	290,595	283,506	99.6	49.5	3.3	1.1	51.6	.4	48.0	46.8		
Vt.	Mulholland Palmer Rose	190,765	101,609	190,765	144,996	42,332	102	102,011	88,754	102,011	100.0	76.0	22.2	.1	53.5	-	46.5	53.5		
		172,112	172,112	406,638	253,257	22,988	4,181	210,641	14,574	195,997	210,641	96.5	60.1	5.5	1.0	50.0	3.5	46.5	50.0	
		Totals for State	2,575,410	1,218,744	2,555,350	1,810,543	336,499	54,594	1,681,512	20,060	873,838	1,652,657	99.2	70.3	13.1	2.1	65.3	.8	33.9	64.2
		206,177	43,261	164,575	57,753	10,850	90	77,294	41,602	87,281	77,294	79.8	28.0	5.3	.1	37.5	20.2	42.3	37.5	
Mass.	Lilley	181,882	47,897	167,229	53,711	5,764	15,915	133,206	34,023	133,206	91.9	29.5	3.2	8.8	73.2	8.1	18.7	73.2		
		346,354	86,389	338,916	127,597	30,831	4,746	320,076	7,438	18,840	313,272	97.9	36.8	8.9	1.4	92.4	2.1	5.5	90.4	
		734,413	177,547	670,720	239,061	47,445	20,751	530,576	63,693	140,144	523,772	91.3	32.6	6.5	2.8	72.2	8.7	19.1	71.3	
		Totals for State	1,463,628	599,413	1,461,598	1,168,020	235,983	3,246	1,376,761	2,030	84,837	579,524	99.9	79.8	16.1	.2	94.1	.1	5.8	39.6
R. I.	Totals for State	147,778	64,018	147,778	144,390	34,068	104,440	147,778	-	-	100.0	95.7	23.1	70.7	100.0	-	-	-		
		459,971	96,226	459,971	307,584	129,643	288,303	459,971	-	-	211,892	100.0	66.9	28.2	62.7	100.0	-	-	46.1	
		707,440	189,535	700,595	573,693	294,230	119,572	590,736	6,845	149,859	549,276	99.0	81.1	41.6	16.9	77.8	1.0	21.2	77.6	
		428,806	125,941	427,596	325,195	158,217	27,508	318,670	1,210	108,926	318,670	99.7	75.8	36.9	6.4	74.3	.3	25.4	74.3	
N. Y.	Barber Charlton Harpp Hick Holcomb Western N. Y.	612,747	285,498	612,747	586,516	429,279	307,631	573,229	39,518	573,229	100.0	95.7	70.1	50.2	93.6	-	6.4	93.6		
		219,998	45,080	216,828	77,439	22,850	22,850	190,106	3,170	66,722	190,106	98.6	76.7	35.2	10.4	68.2	1.4	30.4	68.2	
		225,540	73,320	223,730	183,255	131,210	23,924	170,535	1,810	53,195	168,200	99.2	81.3	58.2	10.6	75.6	.8	23.6	74.6	
		Totals for State	2,330,064	744,894	2,306,937	1,903,745	1,095,208	512,813	1,822,798	23,127	484,139	1,819,003	99.0	81.7	47.0	22.0	78.2	1.0	20.8	78.1
N. J.	Totals for State	16,742	3,771	16,742	1,417	-	-	16,742	-	-	100.0	8.5	-	-	100.0	-	-	-		
		162,476	30,293	161,766	94,696	13,840	18,988	145,435	710	16,331	111,127	99.6	58.3	8.5	11.7	89.5	.4	10.1	68.4	
		325,507	75,218	324,194	226,674	73,098	46,435	293,372	1,313	30,822	281,538	99.6	69.6	22.5	14.3	90.1	.4	9.5	86.5	
		Totals for State	487,983	105,511	485,960	321,370	86,938	65,423	438,807	2,023	47,153	392,665	99.6	65.9	17.8	13.4	89.9	.4	9.7	80.5
Del.	Totals for State	6,186	242	6,186	-	-	-	6,186	-	-	100.0	-	-	-	100.0	-	-	-		
		164,474	70,718	163,994	17,166	27,595	-	152,434	480	11,560	97,881	99.7	10.4	16.8	-	92.7	.3	7.0	99.5	
		146,314	48,179	146,314	65	65	-	146,314	-	-	105	100.0	.1	.1	-	100.0	-	-	.1	
		Totals for State	766,404	321,754	764,053	142,245	44,926	2,107	645,152	2,351	118,901	475,680	99.7	18.6	5.9	.3	84.2	.3	15.5	62.1
Va.	Cramer	2,032,399	778,177	2,008,568	131,891	78,032	19,485	1,890,814	-	-	98.8	6.5	3.8	1.0	93.0	1.2	5.8	93.0		
		674,355	544,478	674,355	1,008	538	-	674,015	-	340	-	100.0	.2	.1	-	99.9	-	.1	-	
		1,629,293	734,075	1,629,293	9,177	4,879	-	1,623,162	-	6,131	33,996	100.0	.6	.3	-	99.6	-	.4	2.1	
		130,870	64,192	130,870	29,635	-	-	130,870	-	-	-	100.0	22.6	-	-	100.0	-	-	-	
Ga.	Stegall	1,630,518	770,052	1,630,518	144,843	5,228	-	1,621,249	-	9,269	18,062	100.0	.9	.3	-	99.4	-	.6	1.1	
		Totals for State	17,666,460	7,239,777	17,418,933	7,777,588	2,622,917	1,123,346	14,879,853	247,527	2,539,080	9,117,571	98.6	44.0	14.8	6.4	84.2	1.4	14.4	51.6
		ALL STATES																		
		GRAND TOTAL																		





State	Land Ownership	Total Control Area	Acreage of White Pine	Net Acreage Worked			Acreage in Control Area			Percentage of Net Worked					Control Area				
				Pre - Maintenance			Now on Maintenance	Requiring No Further Work	Needing Further Attention			Worked			On Main-tenance	Further Rework	Needing Attention		
				First	Second	Other			Mainten-ance	First	Rework	Mainten-ance	First	Second				Other	Mainten-ance
Maine	State and Private	2,250,421	893,586	2,140,549	1,525,005	490,695	1,496,037	93,192	109,932	644,512	1,402,845	95.1	67.8	19.6	2.2	66.5	4.9	28.6	62.3
N. H.	"	2,572,336	1,217,744	2,552,276	1,807,559	333,821	1,678,518	28,855	20,060	873,758	1,649,663	99.2	70.3	13.0	2.1	65.3	.8	33.9	64.1
Vt.	"	732,105	177,003	668,412	238,946	47,445	528,268	6,804	63,693	140,144	521,464	91.3	32.6	6.5	.2	72.2	8.7	19.1	71.2
Mass.	"	1,463,628	599,413	1,461,598	1,168,020	235,983	1,376,761	797,237	2,030	84,837	579,524	99.9	79.8	16.1	.2	94.1	.1	5.8	39.6
R. I.	"	147,778	64,018	147,778	144,390	34,068	147,778	147,778	-	-	-	100.0	95.7	23.1	70.7	100.0	-	-	-
Conn.	"	459,971	96,226	459,971	307,584	129,643	459,971	248,079	-	-	-	100.0	66.9	28.1	62.7	100.0	-	-	-
N. Y.	"	2,329,109	744,728	2,305,982	1,902,790	1,094,253	1,822,798	16,742	23,127	483,184	1,819,003	99.0	81.7	47.0	22.0	78.3	1.0	20.7	78.1
N. J.	"	16,742	3,771	16,742	1,417	1,094,253	16,742	16,742	-	-	-	100.0	8.5	-	-	100.0	-	-	-
Pa.	"	483,898	104,554	481,875	317,840	85,443	434,837	46,142	2,023	47,038	388,695	99.6	65.7	17.7	13.5	89.9	.4	9.7	80.3
Del.	"	6,186	242	6,186	-	-	6,186	6,186	-	-	-	100.0	-	-	-	100.0	-	-	.1
Ky.	"	114,312	31,199	114,312	-	-	114,312	114,282	-	-	-	100.0	-	-	-	100.0	-	-	-
Md.	"	164,474	70,718	163,994	-	-	152,434	54,553	-	-	-	100.0	-	-	-	100.0	-	-	-
Va.	"	1,533,535	558,180	1,516,172	17,166	27,995	1,451,205	-	480	11,560	97,881	99.7	10.4	16.8	-	92.7	.3	7.0	59.5
W. Va.	"	621,742	242,817	620,972	40,886	13,563	512,709	137,000	17,363	64,967	1,451,205	98.9	2.7	.9	.7	94.6	1.1	4.3	94.6
Ca.	"	324,452	248,576	324,452	120,995	26,615	324,452	324,452	770	108,263	375,709	99.9	19.4	4.3	.2	82.5	-	1.1	17.4
N. Car.	"	1,362,155	581,785	1,362,155	4,654	2,416	1,359,462	1,356,491	-	150	2,693	100.0	.2	.1	-	99.9	-	.1	-
S. Car.	"	77,008	45,398	77,008	25,935	-	77,008	77,008	-	-	-	100.0	.3	.2	-	99.8	-	.2	-
Tenn.	"	1,065,663	465,679	1,065,663	12,740	5,187	1,058,916	1,042,155	-	6,747	16,761	100.0	1.2	.5	-	99.4	-	.6	1.6
Sub-Total	State and Private	15,725,575	6,145,637	15,486,097	7,633,205	2,527,168	13,018,244	4,500,601	239,478	2,467,853	8,517,643	98.5	48.5	16.1	7.1	82.8	1.5	15.7	54.2
Me. & N.E.	White Mountain	5,379	2,000	5,379	5,136	2,874	4,797	-	-	582	4,797	100.0	95.5	53.4	19.9	89.2	-	10.8	89.2
Vt.	Green Mountain	2,308	544	2,308	115	1,155	2,308	-	-	-	2,308	100.0	5.0	-	-	100.0	-	-	100.0
Pa.	Allegheny	4,085	957	4,085	3,530	1,495	3,970	-	-	115	3,970	100.0	86.4	36.6	5.9	97.2	-	2.8	97.2
Ky.	Cumberland	32,002	16,980	32,002	65	65	32,002	31,927	-	-	75	100.0	.2	.2	-	100.0	-	-	.2
Va. & W. Va.	Jefferson	108,529	55,218	107,654	4,700	4,809	103,015	-	875	4,639	103,015	99.2	4.3	4.4	1.8	94.9	.8	4.3	94.9
W. Va.	Geo. Washington	429,388	193,367	422,214	90,481	65,713	370,248	20,472	7,174	51,966	358,248	98.3	21.1	15.3	1.7	86.2	1.7	12.1	83.4
Ca.	Monongahela	89,559	46,854	89,559	11,606	7,415	84,176	349,713	-	5,383	63,704	100.0	13.0	8.3	.5	94.0	-	6.0	71.1
N. Car.	Chattahoochee	349,903	295,902	349,903	330	97	349,713	349,713	-	190	-	100.0	.1	.1	-	99.9	-	.1	-
N. Car.	Nantahala	62,709	42,138	62,709	7	-	62,695	62,695	-	14	-	100.0	.1	-	-	99.9	-	.1	-
N. Car.	Pisgah	161,752	92,701	161,752	2,828	-	158,670	157,774	-	3,082	896	100.0	1.7	1.1	-	98.1	-	1.9	-
S. Car.	Sumter	53,862	18,794	53,862	3,700	-	53,862	53,862	-	-	-	100.0	6.9	-	-	100.0	-	-	-
Tenn.	Cherokee	485,103	290,105	485,103	2,103	41	482,581	481,280	-	2,522	1,301	100.0	.4	.1	-	99.5	-	.5	.3
Sub-Total	National Forests	1,784,579	1,015,560	1,776,530	124,601	84,239	1,708,037	1,169,723	8,049	68,493	538,314	99.5	7.0	4.7	.6	95.7	.5	3.8	30.2
Maine	Acadia	16,872	3,200	16,872	11,271	4,979	16,872	-	-	-	16,872	100.0	66.8	29.5	19.1	100.0	-	-	100.0
New York	Saratoga Battlefield	955	166	955	955	955	-	-	-	955	-	100.0	100.0	100.0	-	-	-	100.0	-
Virginia	Shenandoah	14,270	3,080	14,270	5,012	4,433	14,270	-	-	-	14,270	100.0	35.1	31.1	.8	100.0	-	-	100.0
Va. & N. C.	Blue Ridge	13,663	6,042	13,663	2,087	526	12,104	11,761	-	1,599	343	100.0	15.3	3.8	-	88.6	-	11.4	2.5
N.C. Tenn.	Great Smokey	110,101	66,070	110,101	457	617	109,881	79,752	-	220	30,129	100.0	.4	.6	-	99.8	-	.2	27.4
Sub-Total	National Parks	155,861	78,558	155,861	19,782	11,510	153,127	91,513	-	2,734	61,614	100.0	12.7	7.4	2.1	98.2	-	1.8	39.5
N. Car.	Cherokee Ind. Res.	445	22	445	-	-	445	445	-	-	-	100.0	-	-	-	100.0	-	-	-
GRAND TOTAL	ALL OWNERSHIPS	17,666,460	7,239,777	17,448,933	7,777,588	2,622,917	14,879,853	5,762,282	247,527	2,539,080	9,117,571	98.6	44.0	14.8	6.4	84.2	1.4	14.4	51.6





TABLE 11 — STATE AND LOCAL COOPERATIVE EXPENDITURES AND CONTRIBUTED SERVICES DURING 1954

STATE	CASH EXPENDITURES					VALUE OF CONTRIBUTED SERVICES		STATE INDIRECT AID	TOTAL
	STATE	TOWNS	COUNTIES	INDIVIDUALS	SUB-TOTAL	STATE	COUNTY		
							TOWN INDIV.		
ME.	\$ 13,600	\$11,179	\$ 500	\$ —	\$ 25,359	\$ 925	\$ —	\$ 1,010	\$ 27,294
N. H.	14,143	36,199	—	571	50,913	545	—	480	51,938
VT.	4,875	6,930	—	88	11,893	300	—	1,500	13,693
MASS.	13,415	—	—	—	13,415	300	—	300	14,015
CONN.	8,525	2,035	—	—	10,560	620	125	200	11,505
N. Y.	121,385	818	21,596	—	143,799	12,927	840	6,570	164,136
PA.	21,842	—	—	—	21,842	1,090	—	2,640	25,572
MD.	2,405	—	—	—	2,405	61	—	100	2,566
VA.	8,359	—	—	—	8,359	200	—	950	9,509
W. VA.	3,064	—	—	—	3,064	263	—	525	3,852
N. CAR.	1,451	—	—	—	1,451	100	—	450	2,001
TENN.	1,492	—	—	—	1,492	50	—	275	1,817
TOTAL	\$214,636	\$57,161	\$22,096	\$ 659	\$294,552	\$17,381	\$965	\$15,000	\$327,898





TABLE 12 -- TOTAL FEDERAL, STATE AND LOCAL EXPENDITURES FOR ALL BLISTER RUST ACTIVITIES DURING 1954

STATE	F E D E R A L				STATE AND LOCAL				COOPERATORS			GRAND TOTAL
	FOREST SERVICE		NATIONAL PARKS	STATES		INDIVIDUALS	TOWNS	COUNTIES	TOTAL			
	LEADER-SHIP	WORK ON		DIRECT AID	INDIRECT AID							
		WORK ON S&P LANDS								WORK ON NATIONAL FORESTS		
ME.	\$ 22,641	\$10,683	\$	-	\$ 14,605	\$ 1,010	\$	\$11,179	\$ 500	\$ 27,294	\$ 60,618	
N. H.	37,525	18,556		-	14,688	480		36,199	-	51,938	108,019	
VT.	20,281	6,573		-	5,175	1,500		6,930	-	13,693	40,547	
MASS.	7,833	2,750		-	13,715	300		-	-	14,015	24,598	
CONN.	2,919	1,682		-	9,145	200		2,160	-	11,505	16,106	
N. Y.	43,313	17,817		191	134,312	6,570		818	22,436	164,136	225,457	
PA.	17,116	6,048		-	22,932	2,640		-	-	25,572	48,736	
MD.	843	669		-	2,466	100		-	-	2,566	4,078	
VA.	14,098	5,964		2,444	8,559	950		-	-	9,509	71,745	
W. VA.	12,601	5,323		-	3,327	525		-	-	3,852	29,322	
N. CAR.	932	600		4,398	1,551	450		-	-	2,001	8,205	
TENN.	1,122	463		-	1,542	275		-	-	1,817	3,973	
TOTAL	\$181,224	\$77,128	\$48,121	\$7,033	\$232,017	\$15,000	\$ 659	\$57,286	\$22,936	\$327,898	\$641,404	

REGIONAL OFFICE COSTS ARE INCLUDED IN THE ABOVE AND PRORATED BY STATES.



UNITED STATES DEPARTMENT OF AGRICULTURE

# FOREST SERVICE

Region 9

ANNUAL REPORT

WHITE PINE BLISTER RUST CONTROL

NORTH CENTRAL REGION

CALENDAR YEAR 1954

Division of State & Private Forestry  
Blister Rust Control Section  
In Cooperation With  
Federal, State, County and Local Agencies



Milwaukee, Wisconsin  
January, 1955





## Blister Rust Control Program Annual Report

North Central Region, Calendar Year 1954

The first full year of operation of the Blister Rust Control project in the Forest Service involved little change in organization or field activity. Except for the transfer of the Project office from Minneapolis to Milwaukee, there was no change in headquarters. Regular Project personnel remained the same except that Miss Mae V. Nilsen transferred from her position as Secretary to the Project Leader to Chief Clerk in the Division of Recreation and Lands. New Memoranda of Understanding concerning blister rust control between the States and the Forest Service were drawn up with no appreciable change in the wording except the substitution of "Forest Service" for "Bureau of Entomology and Plant Quarantine". The establishment of three Areas within the region, which was started earlier, was completed in 1954. The processing of payrolls and vouchers for temporary personnel was transferred from area offices to the closest national forests. There was no change in blister rust control policy or in the conduct of the work.

### Organization and Responsibility

Blister rust control is a cooperative project in the Division of State and Private Forestry of the U. S. Forest Service. The BRC organization consists of a Project and Assistant Project Leader, 3 Area Leaders, 7 District Leaders and 4 State Agents. This organization is responsible for the leadership, coordination and technical direction of the program on lands of all ownerships. Authority for doing the work on state and private lands is contained in the Insect Pest and Plant Disease laws of the cooperating states. Labor is supplied by the pine owners and land managing agencies. 12

### Status of the Rust

Blister rust is widespread throughout the region, ranging from very heavy in the north to very light in the south. Commercial damage has been averted in protected stands while serious losses have been sustained in unprotected stands, especially in the northern part of the region. Blister rust infection on pine was found for the first time in Fulton, Grundy, Henry, McLean and Rock Island Counties, Illinois, Licking County, Ohio and Kenosha County, Wisconsin. Weather conditions were extremely favorable for spread of the rust in the northern parts of the Lake States. Protracted periods of cool, rainy weather in late summer and early fall favored pine infection and it is believed that a wave of 1954 cankers will become evident in about 3 years.





## Accomplishments in 1954

### Surveys

Over 66,000 acres of white pine were surveyed and mapped during the year. Much of it was new pine resulting from natural regeneration and planting. This increased the total control problem by 49,800 acres of pine by adding 200 acres in Illinois, 14,600 in Michigan, 19,000 in Minnesota and 17,600 in Wisconsin. Ohio lost 1,600 acres when surveys revealed that some previously mapped areas no longer had values warranting protection. By ownerships, the increases were distributed as follows; 37,800 acres Private, 2,000 acres State and County, and 10,000 on National Forests. The white pine acreage in the region is continuing to increase as more second growth trees reach seed-bearing age and new plantations are established.

### Local Control

The region protected 45,576 acres of white pine by destroying 1,487,936 ribes on 95,341 acres of control area at an expenditure of 13,533 man-days in 1954. More than half of the work done was initial. On state and private lands the ratio of initial work to rework was  $2\frac{1}{2}$  to 1, while on national forests it was 1 to 2, and on Indian reservations 1 to 6. The largest acreage to be covered initially was on state and private lands. Control work on federal lands is fairly up to schedule and the big job is rework rather than initial. Work on state and private lands was performed by state and private labor supervised on the ground by experienced crew leaders employed on federal and state funds. Extensive use was again made of prison trusty labor in Michigan. These men make excellent ribes eradicators. Several Wisconsin counties provided forest crop law money for the employment of labor to protect county-owned pine. Conservation departments in all states except Indiana and Ohio supplied funds for labor employed in protecting state-owned pine. Work on national forests and Indian reservations was done by local labor paid from federal BRC funds except on the Menominee Indian Reservation, where the tribe matched federal funds with tribal funds. Due to the scattered locations of pine areas and the absence of qualified contractors, the bulk of the control work was done by hourly paid labor. However, 29 ribes eradication contracts covering 13,645 acres were let and successfully completed, mostly on the national forests in Michigan. Most of the control work was done by uprooting ribes but chemicals were used wherever practicable. All control work in Illinois and some in Michigan and Wisconsin, totaling 1,922 acres, was done with chemicals.

Checking after eradication showed that work of satisfactory quality had been done on practically all areas. Of the 95,341 acres worked 85,197 acres were checked revealing that 98.7 percent of the acreage had less than 15 feet of ribes live stem per acre remaining, and that 99.9 percent contained less than 25 F.L.S. Only 125 acres were found to have more than 25 F.L.S. per acre remaining, and these will be reworked in the spring of 1955. In addition, 10,144 acres were worked but not formally checked, either because insufficient ribes were found to justify the cost





of a formal check, or checking was postponed until the spring of 1955. This includes the 1,922 acres on which chemical ribes eradication was performed and on which checking of results must necessarily be postponed for a year.

### Nursery Sanitation

Nursery sanitation was performed around 4 nurseries (3 state and 1 private) all in Wisconsin. Ribes-free conditions are being maintained around 43 nurseries producing about 25 million white pines annually in the region.

### Canker Pruning

Cankers were removed to save 8,610 infected white pines growing in protected stands in Iowa, Minnesota and Wisconsin. To do this work, 82 man-days were used or an average of over 100 trees pruned per man-day.

### Status of Control

The total control problem in the region includes 1,232,246 acres of white pine and 3,686,703 acres of control area. This is an increase of 49,741 acres of pine and 48,175 acres of control area over a year ago.

To date 85.2 percent of the total has been initially worked and 43.2 percent is on maintenance.

The program is fairly well on schedule for all classes of public ownership, especially the Indian Service and the Forest Service, but lags somewhat on state lands and is far behind in private ownership. Control work is most advanced on Indian reservations with 98.0 percent of the control area initially worked and 77.5 percent on maintenance. Most of the initial and rework needed is on the Menominee Indian Reservation.

Work on national forests is on schedule with 92.3 percent initially worked and 70.2 percent on maintenance. Most of the remaining work is on the Superior National Forest where ribes are very abundant and costs are high due to the necessity of camp operation.

Control work on state, county and municipal lands is fairly up-to-date in all states except Minnesota. In this state white pine areas on non-federal public lands are frequently intermingled with federal ownership and many of them are inaccessible. Ribes are abundant and costs are high and state funds for control work have been insufficient.

The biggest job remaining is the protection of privately-owned white pine. Initial work has been done on 80.9 percent of the acreage but only 37.2 percent is on maintenance. Of the 2,077,752 acres in the region needing initial and rework, 1,446,608 acres or 70 percent are in private ownership.





## Long-Term Work Plans

Work plans for an orderly schedule of protection have been prepared and followed for all national forests and Indian reservations and a few state forests. They are based on expected funds and schedule each area for at least one working in a 10-year period. Such plans insure continuity of needed work and economy of operation. They list areas according to geographical location and group them in workable units for ease of management. These plans also schedule proper intervals of time between workings. As the result of reasonably adequate funds for doing control work and following a realistic long-term plan, protection of federally-owned pine is on schedule. This is not true of white pine stands in private ownership. Inadequate funds in unpredictable amounts which vary from year to year make it difficult to chart a long-term course of protection. Consequently, the work on private lands has been done on a year-to-year basis as finances dictate. At the rate that privately-owned stands are currently being worked (56,868 acres in 1954) it would require over 20 years to cover the 1,146,608 acres in private ownership needing initial or rework. And this would permit of working each area only once. Many areas require more than one working before they can be placed on maintenance. Also, it does not take into account increases in pine acreage due to natural reproduction and planting. The preparation of long-term work plans for privately-owned lands will not be practical until a reasonably stable program of financing the work is found. In the meantime, protection will be afforded those areas for which owners provide funds or labor for doing the work. At the current low rate of private participation much valuable white pine will remain exposed to the ravages of the disease.

## Informational Activities

An important function of the BRC organization is to tell people what blister rust is, the damage it can do, and how it can be controlled. The owner is expected to supply the labor to protect his own pine. The informational phase of the program is therefore aimed at helping the pine owner help himself.

News releases, radio talks, showing of the BRC movies, talks at schools and to groups, exhibits, window displays, and conducted tours to blister rust demonstration areas continued to be the means of acquainting the public with blister rust and its control. Individual contacts with pine owners in the field continue to be the most effective means of obtaining direct participation in the control program from the pine owners.

## Other Work

Responsibility for Forest Service participation in forest pest control on state and private lands was transferred to the BRC organization in the fall of 1954. Authority for this work is contained in the Forest Pest Control Act, Public Law 110 of June 25, 1947. The BRC organization will work with the cooperating states by imparting information about insect and disease outbreaks and control work occurring in other states of the region, assisting in educational work, reporting insect outbreaks observed, and cooperating with states in controlling outbreaks to the extent prescribed by the Forest Pest Control Act.





BRC personnel will represent the Division of State and Private Forestry at the respective headquarters to an increasing extent as they become more familiar with the cooperative forestry activities of the Division.

### Costs

Although federal cooperative funds for fiscal year 1955 were half what they were in fiscal year 1954, total funds for control work in calendar year 1954 were greater than in 1953 due primarily to increased state participation. State contributions, \$112,000, the highest ever, were higher by \$9,100 than in 1953. State Direct Aid was nearly two and one-half times the amount of federal cooperative funds for work on state and private lands. Funds for work on national forests and Indian reservations were about the same as in calendar year 1953.

### Recommendations

Because the current annual rate of protecting white pine areas, especially those in private ownership, is wholly inadequate, every effort should be made to step up the eradication program. This can be done by increased participation by cooperators and improved techniques. It is recommended that:

1. Further diligent effort be made to acquaint private pine owners with the need for blister rust control on their lands and obtain their active support in eradicating ribes.
2. Private owners, county and state officials be made aware that blister rust control is a necessary forest protection measure which should be an accepted practice under the Agricultural Conservation Program.
3. Ties with service foresters be strengthened so they will encourage their clients to do necessary blister rust control work. BRC men should become better acquainted with the Cooperative Forest Management and Protection programs.
4. Studies in use of chemicals as herbicides be continued and resulting improvements in formulations and techniques be adopted in the field as rapidly as possible.
5. Van Arsdell's studies of the effect of micro-climate on rust behavior be continued, and the field be kept advised on practical application of the findings. It is believed that savings can be made by reducing or eliminating control work in sections where climatic conditions inhibit spread of the rust. Conversely there are other sections of the region where climatic conditions appear to be so favorable to rust development that present control zones may be inadequate. A more complete knowledge of these conditions will result in a more economical and effective control program.



6. BRC personnel be instructed in recognizing and controlling other forest pests so that in their contacts with forest and woodlot owners they can render greater service. This broader scope of activity will serve to increase the number of contacts and encourage greater interest in all forest protection measures including blister rust control.





# Summary of White Pine Blister Rust Control - December 31, 1954

## NORTH CENTRAL REGION

Estimated Commercial Value of White Pine in Control Area - \$406,000,000

### Local Control, 1954

Operating Agency	Acres Worked		Ribes Destroyed	Man-Days Used	Per Acre	
	Initial	Re-Work			Ribes	Man-Days
State-Coop.	40,360	16,508	56,868	729,600	5,993	12.8
Nat. Forests	9,507	22,271	31,778	534,402	5,393	16.8
Ind. Service	933	5,762	6,695	223,934	2,147	33.4
Total	50,800	44,541	95,341	1,487,936	13,533	15.6

### Status of Control (Net)

Item	Nat. Forests	Ind. Reserv.	Non-Fed. Public	Private	Total
W.P. in Control Area, Acres	159,276	81,869	354,415	636,686	1,232,246
Total Control Area, Acres	326,715	138,100	918,912	2,302,976	3,686,703
Percent Worked Initially	92.3	98.0	91.4	80.9	85.2
Percent On Maintenance	70.2	77.5	45.3	37.2	43.6
Needing Initial Work, Acres	25,233	2,782	78,972	439,880	546,867
Needing Re-Work, Acres	71,983	28,244	423,930	1,006,728	1,530,885
Needing Maintenance Work, Acres	229,499	107,074	416,010	856,368	1,608,951

**Blister Rust Infection, 1954:** Found on pine initially in Fulton, Grundy, Henry, McLean and Rock Island Counties, Illinois; Licking County, Ohio; and Kenosha County, Wisconsin. Infection chiefly as 1951 cankers. Cumulative: On pines and ribes in all seven states. Found on pines in 202 counties; on ribes in 390 counties in the region.

**Nursery Sanitation, 1954:** 4 nurseries worked, all in Wisconsin. Cumulative: Ribes-free zones maintained around 44 nurseries producing about 25 million white pine trees annually.

**Canker Pruning, 1954:** 10,827 cankers removed to save 8,610 infected trees; 656 fatally infected trees removed, from Iowa, Minnesota and Wisconsin.

**Surveying, 1954:** 75,144 acres control area initially surveyed; 70,363 acres control area post-checked, and 60,731 acres retained.

**Checking After Eradication, 1954:** 85,197 acres checked for ribes after eradication, and all but 125 found satisfactory.

**Cultivated Black Currant Elimination, 1954:** 5 plantings with 359 bushes found and destroyed, all in Michigan, by State Inspectors.

**Control Area Permits, 1954:** 368 applications received; 315 approved; 30 rejected; 23 voluntarily cancelled in Michigan, Minnesota, Ohio and Wisconsin.





# Summary of White Pine Blister Rust Control - December 31, 1954

## ILLINOIS

Estimated Commercial Value of White Pine in Control Area - \$2,000,000

### Local Control, 1954

Operating Agency	Acres Worked			Ribes Destroyed	Man-Days Used	Per Acre	
	Initial	Re-Work	Total			Ribes	Man-Day
State-Coop.	799	207	1,006	31,970	49	31.8	0.05

### Status of Control (Net)

Item	Non-Federal		
	Public	Private	Total
White Pine in Control Area, Acres	1,464	888	2,352
Total Control Area, Acres	7,391	5,260	12,651
Percent Worked Initially	98.7	91.9	95.8
Percent on Maintenance	21.4	11.1	17.1
Needing Initial Work, Acres	98	428	526
Needing Re-Work, Acres	5,708	4,248	9,956
Needing Maintenance Work, Acres	1,585	584	2,169

Blister Rust Infection, 1954: On pine for first time in Fulton, Grundy, Henry, McLean and Rock Island Counties. Infection chiefly of 1951 origin in young plantations. Found in winter, so ribes infection undoubtedly present previously, but not reported from Fulton and McLean Counties.  
Cumulative: On pines in 12 counties, on ribes in 24 of the 102 counties in the state.

Nursery Sanitation, 1954: None. Cumulative: Ribes-free zones maintained around 2 nurseries.

Surveying, 1954: 1,299 acres control area initially surveyed; 142 acres control area post-checked, and 72 acres retained.

Checking After Eradication, 1954: None. Since all ribes eradication was done by chemicals, checking deferred until 1955, when results will be more conclusive.



# Summary of White Pine Blister Rust Control - December 31, 1954

## INDIANA

Estimated Commercial Value of White Pine in Control Area - \$7,000,000

Local Control, 1954 - None Performed

### Status of Control (Net)

Item	National		Non-Federal		Total
	Forests		Public	Private	
White Pine in Control Area, Acres	18		3,169	7,560	10,747
Total Control Area, Acres	179		18,209	74,196	92,584
Percent Worked Initially	100.0		95.1	83.5	85.9
Percent on Maintenance	100.0		86.3	68.8	72.3
Needing Initial Work, Acres	-		887	12,213	13,100
Needing Re-Work, Acres	-		1,599	10,970	12,569
Needing Maintenance Work, Acres	179		15,723	51,013	66,915

Blister Rust Infection, 1954: No new counties. Cumulative: On white pine in 3 northern counties; on ribes in 53 of the 92 counties in the state.

Nursery Sanitation, 1954: None. Cumulative: Ribes-free zones maintained around 3 nurseries.





# Summary of White Pine Blister Rust Control - December 31, 1954

IOWA

Estimated Commercial Value of White Pine in Control Area - \$5,000,000

## Local Control, 1954

Operating Agency	Acres Worked			Ribes	Man-Days	Per Acre	
	Initial	Re-Work	Total	Destroyed	Used	Ribes	Man-Days
State-Coop.	-	715	715	12,479	285	17.5	0.40

## Status of Control (Net)

Item	Indian	Non-Federal		Total
	Reserv.	Public	Private	
White Pine in Control Area, Acres	50	589	2,485	3,124
Total Control Area, Acres	500	3,678	10,551	14,729
Percent Worked Initially	100.0	98.3	63.2	73.2
Percent On Maintenance	41.2	5.4	19.5	16.7
Needing Initial Work, Acres	-	64	3,887	3,951
Needing Re-Work, Acres	294	3,415	4,609	8,318
Needing Maintenance Work, Acres	206	199	2,055	2,460

Blister Rust Infection, 1954: No new counties. Cumulative: On pine in 11 counties in northeast; on ribes in 56 of 99 counties in the state.

Nursery Sanitation, 1954: None. Cumulative: Ribes-free zones maintained around 7 nurseries.

Canker Pruning, 1954: 32 cankers removed to save 25 infected trees; 14 fatally infected trees removed.

Surveying, 1954: 32 acres control area initially surveyed; 641 acres post-checked, and 638 acres retained.

Checking After Eradication, 1954: 696 acres checked for ribes after eradication, and all found satisfactory.





# Summary of White Pine Blister Rust Control - December 31, 1954

## MICHIGAN

Estimated Commercial Value of White Pine in Control Area - \$164,000,000

### Local Control, 1954

Operating Agency	Acres Worked			Ribes Destroyed	Man-Days Used	Per Acre	
	Initial	Re-Work	Total			Ribes	Man-Days
State-Coop.	8,482	8,648	17,130	248,450	2,275	14.5	0.13
Nat. Forests	4,500	14,589	19,089	132,701	1,215	7.0	0.06
Total	12,982	23,237	36,219	381,151	3,490	10.5	0.10

### Status of Control (Net Acres)

Item	Nat. Forests		Non-Federal		Total
			Public	Private	
W.P. in Control Area, Acres	73,789		139,954	222,911	436,654
Total Control Area, Acres	186,029		323,633	728,857	1,238,519
Percent Worked Initially	94.0		91.5	86.9	89.2
Percent On Maintenance	77.3		51.9	34.6	45.6
Needing Initial Work, Acres	11,235		27,390	95,646	134,271
Needing Re-Work, Acres	30,905		128,139	381,022	540,066
Needing Maintenance Work, Acres	143,889		168,104	252,189	564,182

Blister Rust Infection, 1954: No new counties. Cumulative: On pines in 55 counties; on ribes in all of the 83 counties in the state. Rust especially severe in Upper Peninsula and in northern half of Lower Peninsula.

Nursery Sanitation, 1954: None. Cumulative: Ribes-free zones maintained around 9 nurseries.

Surveying, 1954: 24,037 acres control area initially surveyed; 28,519 acres control area post-checked, and 25,819 acres retained. Surveys increased control problem by 14,691 acres of white pine.

Checking After Eradication, 1954: 28,816 acres checked for ribes after eradication, and all but 60 acres found satisfactory.

Cultivated Black Currant Elimination, 1954: 5 plantings with 359 bushes found and destroyed by State Inspectors. No known locations remain.

Control Area Permits, 1954: 97 applications received; 58 permits issued; 22 rejected, and 17 voluntarily cancelled.





# Summary of White Pine Blister Rust Control - December 31, 1954

## MINNESOTA

Estimated Commercial Value of White Pine in Control Area - \$41,000,000

### Local Control, 1954

Operating Agency	Acres Worked			Ribes Destroyed	Man-Days Used	Per Acre	
	Initial	Re-Work	Total			Ribes	Man-Days
State-Coop.	957	1,374	2,331	141,924	946	60.9	0.41
Nat. Forests	1,591	4,832	6,423	238,252	2,722	37.1	0.42
Ind. Service	-	1,677	1,677	96,097	727	57.3	0.43
Total	2,548	7,883	10,431	476,273	4,395	45.7	0.42

### Status of Control (Net Acres)

Item	Nat.		Ind.		Non-Fed.		Total
	Forests	Reserv.	Public	Private	Public	Private	
W.P. in Control Area, Acres	43,969	20,587	53,034	109,436			227,026
Total Control Area, Acres	64,934	30,599	109,591	315,432			520,556
Percent Worked Initially	83.8%	99.9%	59.9%	70.5%			71.6%
Percent On Maintenance	49.8%	74.6%	18.4%	15.2%			23.7%
Needing Initial Work, Acres	10,543	43	43,985	93,157			147,728
Needing Re-Work, Acres	22,070	7,725	45,419	174,279			249,493
Needing Maintenance Work, Acres	32,321	22,831	20,187	47,996			123,335

Blister Rust Infection, 1954: No new counties. Cumulative: On pines in 39 counties; on ribes in 38 of the 87 counties in the state. Rust prevalent in all pine-growing counties, especially severe in northeastern Minnesota.

Nursery Sanitation, 1954: None. Cumulative: Ribes-free zones maintained around 4 nurseries.

Canker Pruning, 1954: 992 cankers removed to save 332 infected trees; 47 fatally infected trees destroyed.

Surveying, 1954: 5,700 acres of control area initially surveyed; 14,444 acres of control area post-checked, and 14,096 acres retained.

Checking After Eradication, 1954: 8,925 acres checked for ribes after eradication, and 8,860 acres, or 99 percent, found satisfactory.

Control Area Permits, 1954: 58 applications received; 53 permits issued; 5 voluntarily cancelled.





# Summary of White Pine Blister Rust Control - December 31, 1954

OHIO

Estimated Commercial Value of White Pine in Control Area - \$14,000,000

## Local Control, 1954

Operating Agency	Acres Worked			Ribes Destroyed	Man-Days Used	Per Acre	
	Initial	Re-Work	Total			Ribes	Man-Days
State-Coop.	1,086	3,299	4,385	3,463	42	0.8	0.01

## Status of Control (Net Acres)

Item	Nat.	Non-Federal		Total
	Forests	Public	Private	
W. P. in Control Area, Acres	515	7,869	14,106	22,490
Total Control Area, Acres	4,029	42,334	140,051	186,414
Percent Worked Initially	100.0	90.1	85.0	86.5
Percent On Maintenance	100.0	43.7	57.0	54.9
Needing Initial Work, Acres	-	4,182	21,071	25,253
Needing Re-Work, Acres	-	19,664	39,087	58,751
Needing Maintenance Work, Acres	4,029	18,488	79,893	102,410

Blister Rust Infection, 1954: On pine for first time in Licking County.

Cumulative: On pine in 11 counties; on ribes in 65 of the 88 counties in the state.

Nursery Sanitation, 1954: None. Cumulative: Ribes-free zones maintained around 7 nurseries.

Surveying, 1954: 1,311 acres control area initially surveyed; 9,579 acres post-checked, and 3,329 acres retained.

Checking After Eradication, 1954: 4,347 acres checked for ribes after eradication, and all found satisfactory.

Control Area Permits, 1954: 15 applications received, 7 approved, 8 rejected.





# Summary of White Pine Blister Rust Control - December 31, 1954

## WISCONSIN

Estimated Commercial Value of White Pine in Control Area - \$173,000,000

### Local Control, 1954

Operating Agency	Acres Worked			Ribes Destroyed	Man-Days Used	Per Acre	
	Initial	Re-Work	Total			Ribes	Man-Days
State-Coop.	29,036	2,265	31,301	291,314	2,396	9.3	0.08
Nat. Forests	3,416	2,850	6,266	163,449	1,456	26.1	0.23
Ind. Service	933	4,085	5,018	127,837	1,420	25.5	0.28
Total	33,385	9,200	42,585	582,600	5,272	13.7	0.12

### Status of Control (Net Acres)

Item	Nat. Forests	Ind. Reserv.	Non-Fed. Public	Private	Total
W.P. in Control Area, Acres	40,985	61,232	148,336	279,300	529,853
Total Control Area, Acres	71,544	107,001	414,076	1,028,629	1,621,250
Percent Worked Initially	95.2%	97.4%	99.4%	79.2%	86.3%
Percent On Maintenance	68.6%	78.5%	46.3%	41.1%	46.1%
Needing Initial Work, Acres	3,455	2,739	2,366	213,478	222,038
Needing Re-Work, Acres	19,008	20,225	219,986	392,513	651,732
Needing Maintenance Work, Acres	49,081	84,037	191,724	422,638	747,480

Blister Rust Infection, 1954: Pine infection found for first time in Kenosha Co. Cumulative: On white pine and ribes in all 71 counties in the state.

Nursery Sanitation, 1954: Boscobel, Gordon, Hayward State Nurseries, and Nepco 5-Mile private nursery worked, using 1 1/2 man-days. Ribes-free conditions being maintained around 12 nurseries.

Canker Pruning, 1954: 9,803 cankers removed from 8,253 trees; 595 fatally infected trees removed from 7 areas in 6 counties, using 52 man-days.

Surveying, 1954: 42,765 acres control area initially surveyed; 17,069 acres post-checked and 16,809 acres retained.

Checking After Eradication, 1954: 42,413 acres worked in 1954 were checked after eradication, and all found satisfactory.

Control Area Permits, 1954: 198 applications received; 197 approved; 1 voluntarily cancelled.

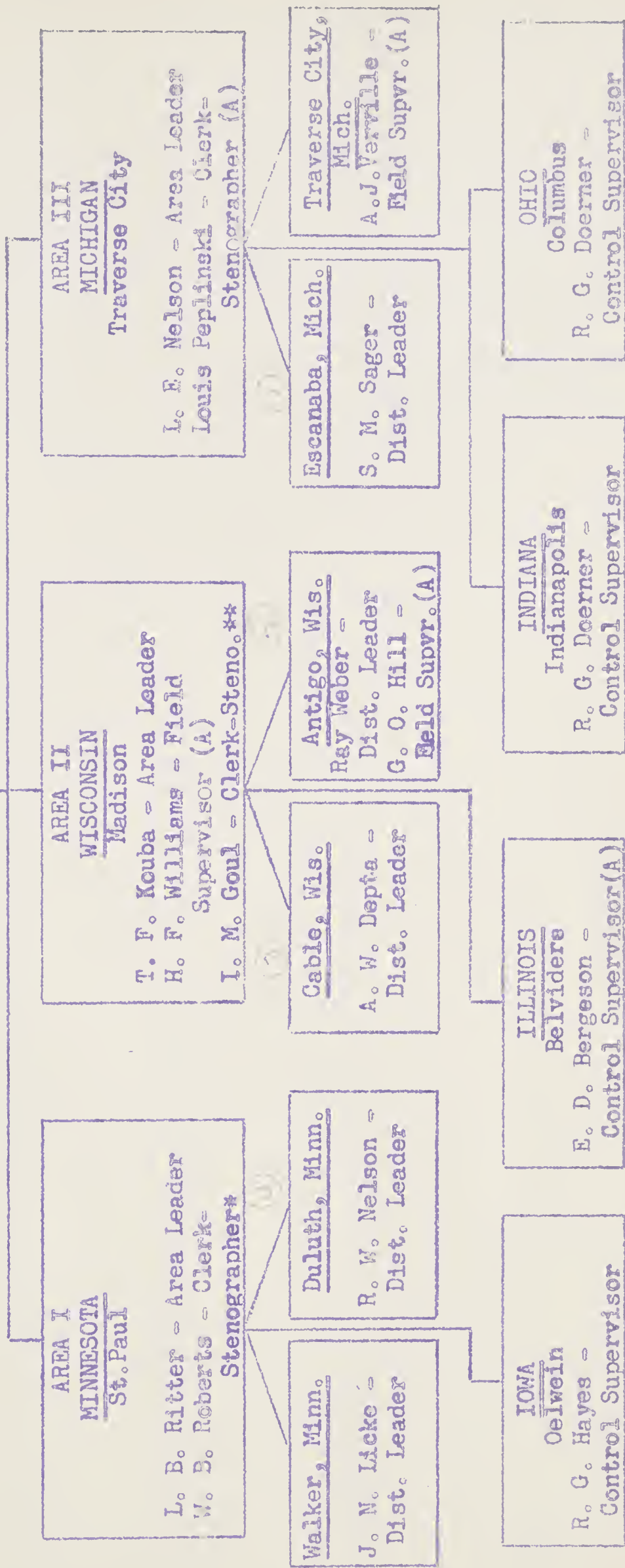


UNITED STATES FOREST SERVICE  
Regional Office Milwaukee, Wisconsin  
H. DEAN COCHRAN - Regional Forester

STATE DEPARTMENTS  
of  
AGRICULTURE AND  
CONSERVATION

Division of State & Private Forestry  
MERLE S. LOWDEN - Chief  
Blister Rust Control Section  
Henry N. Putnam - Leader  
John K. Kroeber - Asst. Leader

UNITED STATES  
INDIAN SERVICE



(A) - Employed on State Funds

\* - Office space and clerical help shared with Barberry Eradication and Grasshopper Control

\*\* - Office space and clerical help shared with Barberry Eradication





Chart 2. Status of Control by Ownership Classes, R-9, on December 31, 1954.

Acres in Control Area

2,250,000

2,000,000

1,750,000

1,500,000

1,250,000

1,000,000

750,000

500,000

250,000

0

Legend:



Not Initially Worked

Initially Worked  
Needing Rework

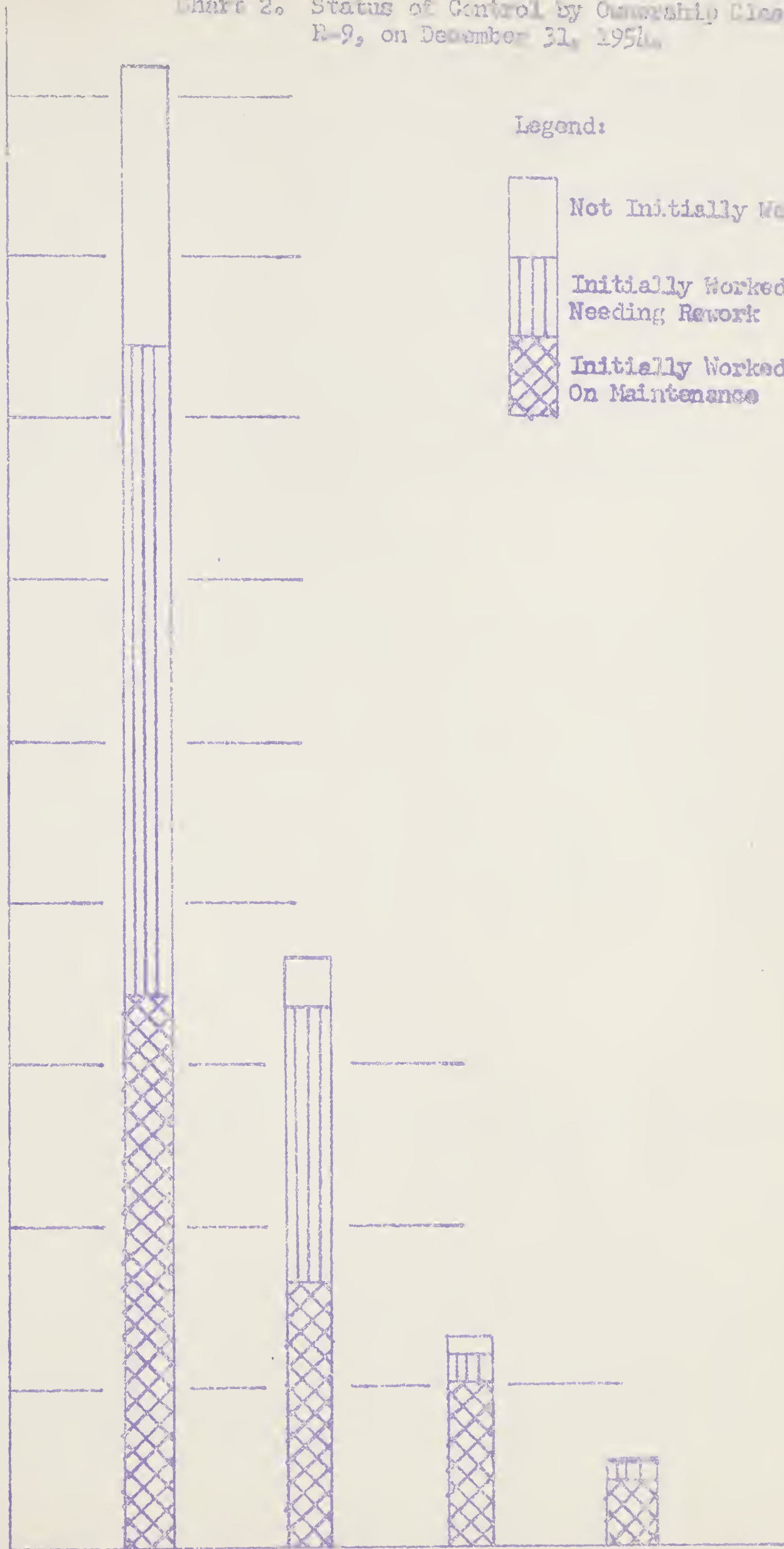
Initially Worked  
On Maintenance

Private

State  
County

Nat.  
Forests

Indian  
Reservations







## Blister Rust Control on National Forests

North Central Region, 1954

### Objective

The objective is to establish and maintain protection against blister rust around all valuable white pine stands and nurseries on national forest lands. This is accomplished by suppression of ribes bushes within infecting distances of white pine stands, and maintenance of these conditions.

### Organization of Work

On January 1, 1954, the Blister Rust Control Project was transferred from the Bureau of Entomology and Plant Quarantine to the Forest Service, where it became a section in the Division of State and Private Forestry. This resulted in no disturbance of conduct of control work, except that pay-rolling and other fiscal matters pertaining to temporary labor was handled by the national forest concerned. The BRC organization directly supervised control work on all forests except the Superior, as in the past few years. Responsibility for preparing work plans and maps, training, checking on adequacy of work, maintaining records, and writing reports remained with the BRC Section. On the Superior National Forest the Forest operated a camp and employed labor and field supervision direct. There was the same close cooperation between the Forest and the BRC organization as on the other forests.

### Current Work, 1954

#### Surveys

The stocked quadrat method of survey was used on all of the 7 forests in Michigan, Minnesota and Wisconsin. The application of survey and post-check data to the control problem is shown in Text Table 2, Status of Control.

#### Local Control

Ribes eradication in 1954 was done on all 7 forests (Text Table 1). Considering both initial and rework, 19,005 acres of pine were protected by removing ribes from 31,778 acres of control area, using 5,393 man-days. About 70% more was accomplished in 1954 than in 1953, when 11,019 acres of pine were protected, by removing ribes from 19,429 acres of control area, using 4,391 man-days. In 1954 about one-third of the acreage covered was initial work and two-thirds rework.





Most of the work in 1954 was done by men employed by the hour. However, there were 28 ribes eradication negotiated contracts, 26 in Michigan and 2 in Wisconsin, awarded and successfully completed in 1954. This was double the number of contracts awarded in 1953. Through contracts in 1954, 13,465 acres were worked, costing \$6,344.74, compared with 2,240 acres costing \$3,108.25 in 1953. The chief limiting factor in awarding ribes eradication contracts is the absence of qualified bidders.

Good eradication work was done on the 31,778 acres covered in 1954. Of the 29,393 acres worked and checked, all but 65 acres passed as satisfactory when checked for ribes after eradication.

### Canker Pruning

To save young white pines in protected areas, cankers originating prior to ribes eradication were removed from 56 crop trees out of 318 trees examined in a plantation on the Chippewa at a cost of 2 man-days. This was experimental work in the Whipholt plantation on the Walker Ranger District. Lower branches to a height of 6 to 8 feet were pruned from crop trees. Besides the silvicultural value, this pruning was a further safety measure, because branches on the lower part of the tree occur where conditions for infection are most favorable.

### Status of Control

In Text Table 2 the status of control on national forests at the end of 1954 is shown. Through surveys approximately 10,000 acres of white pine and 14,000 acres of control area were added to the control problem in 1954. These increases, practically all as natural pine, were made principally on the Superior, Manistee, Huron and Hiawatha National Forests. This additional pine acreage added to the problem just about offset the 9,500 acres of pine initially protected in 1954. The result is that at the end of 1954 there was nearly the same acreage needing initial working as at the end of 1953.

During 1954 13,000 acres were placed on maintenance. At the end of the year for all forests, 92.3% of the control area had been initially worked, and 70.2% was on maintenance. Practically 95% or more of the white pine on all forests except the Huron and Superior National Forests has been initially worked, and much of it is on maintenance. On these two Forests approximately 75% of the pine has been initially worked, and 40% is on maintenance. Acres still needing work on the Huron National Forest are principally new areas added to the problem. In general, ribes are not abundant here.

On the Superior National Forest control work is costly because (1) ribes are abundant; (2) control zones have to be wider than in other parts of the region due to weather conditions favorable to the rust; and (3) areas are inaccessible necessitating camp operation. A high proportion of the 25,000 acres needing initial and 72,000 acres needing rework is found on the Superior National Forest.





## National Forest Costs, 1954

As given in Text Table 3, \$91,724.72 of Forest Service funds for work on national forests were spent on field operations. Most of these funds (\$84,509.14) were spent in ribes eradication. The costs per acre worked and per effective man-day are shown following:

### Costs Per Acre and Per Effective Man-Day of Ribes Eradication on National Forests, R-9, in 1954

National Forest	: Ribes Eradication, 1954			: Av. Cost Per:	
	: Acres Worked:	Man-Days Used:	Costs	: Acre Worked:	Man-Day
Huron N. F.	2,961	227	\$2,537.28	\$0.86	\$11.18
Manistee N. F.	5,718	91	922.62	0.16	10.14 *
Marquette N. F.	7,650	318	4,220.31	0.55	13.27 *
Ottawa N. F.	2,660	578	6,300.02	2.37	10.90
Superior N. F.	5,030	2,177	46,074.35	9.16	21.16
Chippewa N. F.	1,393	545	6,415.55	4.61	11.77
Chequamegon N.F.	5,266	1,187	15,225.30	2.89	12.83
Nicolet N. F.	1,000	269	2,813.71	2.81	10.46
	31,678	5,392	\$84,509.14	2.67	15.67

\* All contract work

The average man-day cost in 1954, \$15.67, was higher than that of 1953, \$14.97. This was due to slightly higher wage rates, and the possible inclusion of costs of common services on some forests. The effective man-day cost on the Superior, \$21.16, while roughly double the average for the other forests, was substantially lower than the \$29.13 in 1953. Costs on the Superior are high because of the additional cost of camp operation.

### Status of Control by Forests

A resume of the status of control on each national forest follows. More detailed accounts are in the individual reports for each forest.

#### Shawnee, Hoosier and Wayne National Forests

All white pine is planted and is now in a maintenance status. Ribes are absent or scarce. White pine growth is excellent. Leader growths of four feet annually are common. White pine yields of 50 M board feet per acre at 50 years of age have been reported from these states.

#### Lower Michigan National Forest - Huron Unit

During 1954 surveys resulted in adding 2,289 acres of white pine and 3,773 acres of control area to the problem. Natural white pine regeneration coming in under oak is increasing the acreage of white pine on the forest.





In 1954 initial and rework was done on 10 areas on the Mio and Tawas Districts. Contract ribes eradication and hired labor were both used. Acreage worked was almost equally divided - 1,480 acres of initial, and 1,481 acres of rework. However, there was an average of 26.7 bushes pulled per acre in initial work, compared with 1.5 bushes in rework.

Due to new pine areas added this year to the control problem, only 74.8% of the control area had been initially worked, and 43.5% was on maintenance at year's end. On a percentage basis, this puts the Huron next to the Superior in work needing to be done. However, ribes are much less abundant and acreage needing work is smaller on the Huron than on the Superior.

According to the long-time work plan, approximately \$1,400 will be spent for local control in May and June, 1955. The budget for 1956 calls for \$3,500 for field work.

#### Lower Michigan National Forest - Manistee Unit

As on the Huron Unit, surveys disclosed an increase in white pine, chiefly through natural regeneration under oak and aspen. The control problem was increased by the addition of 2,874 acres of white pine, and 5,723 acres of control area.

Local control in 1954 was done entirely by the contract method. Two contractors were used with excellent results. Checking after ribes eradication showed all work to be well within the standard allowable. Initial and rework were done on the Baldwin, Cadillac, Manistee and White Cloud Districts.

At year's end 96.1% of 83,483 acres in the forest control area had been initially worked, and 92.9% of it had been placed on maintenance. Over 3,000 additional acres of control area were placed on maintenance in 1954. However, because the acreage added to the control problem in 1954 was larger than what was worked, the accomplishments, expressed in percentages, were less at the end of 1954 than at the end of 1953.

For the period January to June, 1955, it is planned to use the \$850 available for initial work on 2,920 acres. The recommended budget for F.Y. 1956 requires \$1,500 for working 3,100 acres. It is expected all of this work will be done by the contract method.

#### Upper Michigan National Forest - Marquette Unit

Survey work in 1954 was incidental to ribes eradication. Post-check was performed on one area of 670 acres of white pine on the St. Ignace District.

In 1954 initial work was done on the Raco, and rework on the St. Ignace and Raco Districts. There were 14 areas with 7,650 acres worked using 318 man-days. All of this work was done by the contract method. Checking after eradication showed that excellent work was performed.





Only minor changes were made in the total problem. All of the 11,702 acres of white pine in 25,720 acres of control area have been initially worked, and 81.4% of it is on maintenance. As a result of work in 1954, 3,855 acres of white pine and 6,710 acres of control area were added to the maintenance category.

According to the 5-year work plan, no work is budgeted for the Marquette Unit until fiscal year 1957. All work in fiscal year 1956 for the Upper Michigan National Forest is planned on the Hiawatha Unit.

#### Upper Michigan National Forest - Hiawatha Unit

Through surveys in 1954 the control problem entirely on the Munising District was increased by 1,265 acres of white pine, and 2,670 acres of control area.

The work plan called for rework of 100 acres on the Rapid River District in 1954. Before working it the District Leader made a post-check. He found so few ribes (182 bushes) that he was able to place the area on maintenance following post-check. Hence, there were no costs for ribes eradication on this forest in 1954.

At year's end there were 14,537 acres of white pine and 38,371 acres of control area listed for protection. Of this control area, 91.8% has been initially worked, and 67.5% is on maintenance. All of the pine on the Manistique and Rapid River Districts has been initially worked, and most of it is on maintenance. All of the initial work and most of the rework remaining is on the Munising District.

Work plans for the period May and June, 1955 include working 1,575 acres on the Munising and Rapid River Districts using 260 man-days employed on the \$3,259 available. Budget for fiscal year 1956 recommends \$6,395 for field work exclusive of overhead. It is proposed to work 4,500 acres using 450 man-days.

#### Ottawa National Forest

Pre-eradication surveys on the Iron River District increased the control problem by 72 acres of white pine, and 333 acres of control area. Post-check surveys necessary for ribes eradication in the coming field season were completed.

Local control in 1954 was done with hired labor. A crew of women did a good job of eradication protecting the Green Plantation in the Bergland District, and the area was placed on maintenance. One area was worked initially on the Iron River District, and 10 areas were reworked on the Bergland, Iron River, Ontonagon and Watersmeet Districts. All work done was satisfactory, as shown by checking after eradication.





At year's end there were 11,103 acres of white pine, with 21,036 acres of control area on the forest listed for protection, of which 98.0% had been initially worked, and 56.5% was on maintenance. Initial work has been completed and most of the areas are on maintenance on the Bergland, Kenton, Ontonagon and Watersmeet Districts. All of the initial work and most of rework remaining is on the Iron River District.

There remain about \$2,253 of F.Y. 1955 funds for use during May and June, 1955. It is planned to use this money in employing 191 man-days to work 2,350 acres. The budget for F.Y. 1956 amounts to \$9,140 for working 3,000 acres using 800 man-days.

### Superior National Forest

Pre-eradication and post-check surveys were carried on by 4 to 6 trained men on 21,570 acres on the Gunflint District. The net result was the addition of 2,903 acres of white pine to the control problem on the forest. The acreage of control area remained approximately the same, because the new areas of pine were extensions of previously mapped pine stands within existing control zones.

Local control was performed out of two camps; one at Sawbill Camp of 15 men on the Tofte District, and the other at Gunflint Camp of 40 men on the Gunflint District. Work started at Sawbill on May 21 and stopped on July 3 with assigned jobs completed. Sawbill Camp personnel were then transferred to Gunflint. Work started at Gunflint on May 24 and terminated September 10.

The quality of labor was exceptionally good. It was composed of experienced local men and forestry students mostly from the University of Minnesota.

Most of the acreage covered in 1954 required crew work. From the 5,030 acres worked an average of 34 ribes per acre was removed. Most of the ribes found were in swamp pockets, which are numerous on the Superior. Work done in 1954 was in accordance with previously prepared plans.

At year's end there were 31,808 acres of white pine with 44,316 acres of control area in the control problem on the Superior, with nearly half of it on the Gunflint District. This does not include areas of white pine in the Roadless or No-Cut areas, nor does it include all of the white pine in the commercial part of the forest. Ribes are abundant, rust is thoroughly established and has practically wiped out many unprotected stands, climate is very favorable to rust development, and many areas are inaccessible. White pine scheduled for protection is in large areas, managed for continuous white pine production, where control costs can be economically justified, and where rust damage is not yet severe.

To date 77.0% of the control area on the forest has been initially worked, and 37.9% is on maintenance. Control is least accomplished on the Superior of all the forests in terms of acres needing work. Because of the abundance of ribes, the forest is far behind other forests in effort still needed to accomplish control.





Early in 1952 a long-time control program for the Superior was developed. This plan has been followed in 1952, 1953 and 1954. With a few minor adjustments, the budget for Fiscal Year 1956 is in accord with the long-time program. The plan is based on need for control, and grouping of work areas each year to avoid excessive travelling and to provide adequate supervision.

For the remainder of F.Y. 1955, it is planned to use the balance of funds, \$8,956 in working 1,386 acres on the Gunflint District, using 639 man-days. The budget for 1956, \$43,000, calls for ribes eradication on 5,103 acres using 2,587 man-days on the Gunflint and survey work on 17,215 acres using 300 man-days on the Kabetogama and La Croix Districts.

#### Chippewa National Forest

Work in 1954 was in accordance with the long-time work plan, based on examination or working of all white pine areas at periodic intervals. Local control was done on 16 areas in all six of the eight ranger districts, with most of the initial work done on the Marcell, and rework on the Bena and Cutfoot Sioux Ranger Districts.

Through surveys, 318 acres of natural white pine requiring work on 541 acres were added to the control problem, chiefly on the Remer District and 47 additional acres of white pine and 116 acres of control area on the Cass Lake District were placed on maintenance.

Initial work has been completed on the Bena, Cass Lake, Cutfoot Sioux and Remer Districts. A small acreage remains to be worked initially on the Marcell and Walker Districts.

The 5-year work plan beginning July 1, 1949 expires on July 1, 1955. This will be fulfilled approximately as planned. A 10-year plan has been prepared providing for necessary surveys and local control. For the period January to June, 1955 it is planned to do local control on the Marcell District to the extent of available funds. For the F.Y. 1956 as part of the 10-year program, it is planned to make post-check surveys and perform local control on the Bena, Cass Lake, Cutfoot Sioux and Walker Districts at a cost of \$5,700 for field work.

#### Chequamegon National Forest

Work in 1954 was in accordance with previous plans prepared jointly by the District Leader and Timber Management of the Forest. Local control was performed on 5,266 acres in 12 areas. Two areas were worked by contract. Approximately half the acreage was worked initially, and half was rework. Initial work was done on the Glidden, Hayward, Park Falls and Washburn Districts, while rework was confined to the Park Falls and Washburn Districts. It is encouraging to note the reduction in number of ribes found on rework. There was an average of 45 ribes found per acre on initial work, compared with 10 ribes on rework.





Ribes eradication was done by hand pulling and by use of chemicals. 2,4,5-T. in fuel oil (3 oz. to the gallon) was used as a basal spray. on concentrations of upland bushes with good results. More chemicals were used than in previous years.

On the Forest as a whole there are practically 28,000 acres of white pine contained in 46,000 acres of control area. Over 60% is on the Washburn Ranger District, with smaller acreages in decreasing order on the Hayward, Park Falls, Glidden and Medford Districts. 93.3% of total control area has been initially worked, and 71.1% is on maintenance. Much of the initial work remaining is on the Park Falls District and needed rework is on the Hayward District. About 2,500 additional acres of control area were placed on maintenance in 1954.

A 10-year program of work by districts beginning with Fiscal Year 1956 was prepared in the fall of 1954. For the period January to June, 1955, it is planned to use the balance of F. Y. 1955 funds, \$4,350, on initial work on the Glidden, Hayward, Park Falls and Washburn Districts. As part of the long-time program, the budget for F. Y. 1956 calls for \$21,150 for field work on these same four districts.

#### Nicolet National Forest

All control work on the Forest in 1954 was done in May and June. One area each was worked initially on the Argonne and Florence Districts, and one area was reworked on the Lakewood District. Invitations to bid on an eradication contract job on the Lakewood District were posted, but no bids were received. All work done was by hired labor.

Except for 370 acres needing initial work on the Florence District, initial work on the Forest total of 25,491 acres has been completed. In order of decreasing acreages, the 13,018 acres of white pine on the Forest are located on the Eagle River, Lakewood, Argonne and Florence Districts. At the end of 1954 nearly 99% of the total control area had been initially worked, and 64% of it was on maintenance.

A revised 5-year program was prepared in the fall of 1954, beginning July 1, 1956. Work plans for the immediate future include completion of initial work and rework on the Florence District in May and June, 1955 on available funds of \$2,460. As part of the 5-year program, the budget for F. Y. 1956 for field work only is \$5,850 for necessary rework of 2,020 acres on the Argonne, Eagle River and Lakewood Districts.





## Text Table 1. Local Control on National Forests

North Central Region, Calendar Year 1954

National Forest	Number of Areas Worked	Acres of White Pine Protected	Acres of Control Area Worked	Ribes Bushes Destroyed	Man-Days Used
<u>Initial Work</u>					
Huron N.F. Mich.	6	855	1,480	39,503	176
Manistee N.F. Mich.	13	1,389	2,730	17,234	48
Marquette N.F. Mich.	1	55	90	3,396	21
Ottawa N.F., Mich.	1	110	200	961	35
Superior N.F. Minn.	17	825	1,170	60,947	638
Chippewa N.F. Minn.	5	165	421	30,801	186
Chequamegon N.F. Wis.	7	2,343	2,766	123,264	972
Nicolet N.F. Wis.	2	275	650	8,673	132
Total, Initial	52	6,017	9,507	284,779	2,209
<u>Rework</u>					
Huron N.F. Mich.	4	687	1,481	2,210	51
Manistee N.F. Mich.	12	1,133	2,988	11,506	41
Marquette N.F. Mich.	13	4,265	7,560	19,710	297
Hiawatha N.F. Mich.	1	40	100	182	3
Ottawa N.F. Mich.	10	1,420	2,460	37,999	542
Superior N.F. Minn.	23	3,258	3,860	110,216	1,539
Chippewa N.F. Minn.	11	607	972	36,288	359
Chequamegon N.F. Wis.	5	1,378	2,500	26,013	215
Nicolet N.F. Wis.	1	200	350	5,499	137
Total, Rework	80	12,988	22,271	249,623	3,184
<u>All Work</u>					
Huron N.F. Mich.	10	1,542	2,961	41,713	227
Manistee N.F. Mich.	25	2,522	5,718	28,740	91
Marquette N.F. Mich.	14	4,320	7,650	23,106	318
Hiawatha N.F. Mich.	1	40	100	182	3
Ottawa N.F. Mich.	11	1,530	2,660	38,960	578
Superior N.F. Minn.	40	4,083	5,030	171,163	2,177
Chippewa N.F. Minn.	16	772	1,393	67,089	505
Chequamegon N.F. Wis.	12	3,721	5,266	149,277	1,187
Nicolet N.F. Wis.	3	475	1,000	14,172	269
Total, All Work	132	19,005	31,778	534,402	5,392

\* All work done by contract





Text Table 2. Status of Control on National Forests, R-9, on December 31, 1954

National Forest	Total Acres		Acres Initially Worked		Percent Control Area		Acres Control Area Requiring:	
	White	Pine	Control Area	White Pine	Initially Worked	On Maintenance	Initial Work	Rework
			Area				Work	Maintenance Work
Hoosier, Ind.	18	179		18	179	100.0	-	179
Wayne, Ohio	515	4,029		515	4,029	100.0	-	4,029
Huron, Mich.	7,762	17,419		5,753	13,034	43.05	4,385	5,455
Manistee, Mich.	28,685	83,483		27,285	80,203	96.1	3,280	2,619
Hiawatha, Mich.	14,537	38,371		13,182	35,221	91.8	3,150	9,325
Marquette, Mich.	11,702	25,720		11,702	25,720	100.0	-	4,778
Ottawa, Mich.	11,103	21,036		10,973	20,616	98.0	420	8,728
Superior, Minn.	31,808	44,316		25,337	34,115	77.0	10,201	17,298
Chippewa, Minn.	12,161	20,618		11,962	20,276	98.3	342	4,772
Chequamegon, Wis.	27,967	46,053		26,379	42,968	93.3	3,085	10,220
Nicolet, Wis.	13,018	25,491		12,903	25,121	98.5	370	8,788
Total	159,276	326,715	301,482	146,015	301,482	92.3	25,233	71,983
						70.2		229,490

Text Table 3. Forest Service Funds Spent on Blister Rust Control on National Forests, R-9, Calendar Year 1954

National Forest	Appropriation		Activity		
	Jan-June	July-Dec.	Total	Surveys and Checking	Ribes Radioation
					Canker Pruning
Huron, Mich.	403.44	2,518.09	2,921.53	134.57	2,537.28
Manistee Mich.	350.00	662.62	1,012.62	30.00	922.62
Marquette, Mich.	2,360.00	1,929.69	4,289.69	-	4,220.31
Hiawatha, Mich.	-	59.69	59.69	59.69	-
Ottawa, Mich.	2,444.44	4,001.32	6,445.76	145.74	6,300.02
Superior, Minn.	20,582.77	30,507.58	51,090.35	5,016.00	46,074.35
Chippewa, Minn.	2,698.31	4,517.79	7,216.10	724.74	6,415.55
Chequamegon, Wis.	4,642.09	11,203.18	15,845.27	619.97	15,225.30
Nicolet, Wis.	2,813.71	-	2,813.71	-	2,813.71
Total	35,294.76	55,429.96	90,724.72	6,730.77	84,509.24
					105.81



Text Table 4a

## Work Plan for National Forests

Last Half of Fiscal Year 1955, and F.Y. 1956

National Forest	January to June, 1955			Fiscal Year 1956		
	Acres to be Worked	Man-Days Worked	Estimated Costs (Field Work Only)	Acres to be Worked	Man-Days Needed	Estimated Costs (Field Work Only)
Huron	2,435	120	\$ 1,400	5,000	320	\$ 3,500
Manistee	2,920	78	850	3,100	120	1,500
Hiawatha	1,575	260	3,259	4,500	450	6,395
Marquette	-	-	-	-	-	-
Ottawa	2,350	191	2,253	3,000	800	9,140
Superior	1,386	639	8,956	5,100	2,587	43,000
Chippewa	400	109	1,116	1,600	520	5,700
Chequamegon	850	400	4,354	5,000	2,100	21,150
Nicolet	915	235	2,460	2,020	555	5,850
Totals	12,831	2,032	\$ 24,648	29,320	7,452	\$ 96,235

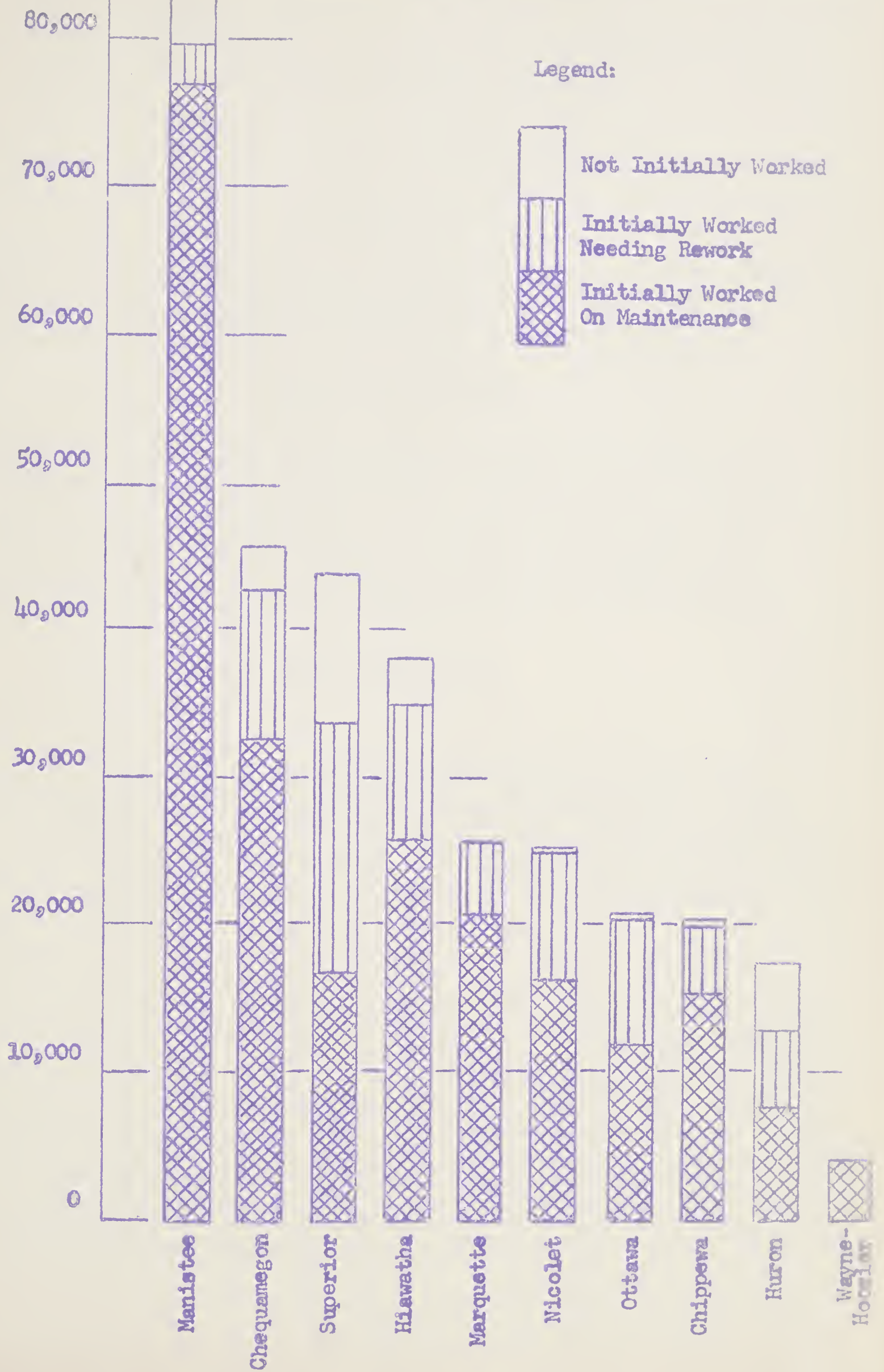
\* Includes post-check of 17,215 acres using estimated 300 man-days





Chart 3. Status of Control on National Forests,  
R-9, on December 31, 1954.

Acres in Control Area







## Blister Rust Control on Indian Reservations

North Central Region, 1954

### Objective

The objective is to establish and maintain blister rust protection around white pine stands of economic value on forest lands administered by the Indian Service. This involves suppression of ribes within infecting distances of white pine stands, and maintenance of these conditions.

### Organization of Work

Transfer of the Blister Rust Control organization from the Bureau of Entomology and Plant Quarantine to the Forest Service on January 1, 1954 had no effect on the conduct of the program on Indian lands. The Indian Service continues to be responsible for selection of white pine areas to be protected, and the employment of labor and field supervision. The Forest Service, through the BRC organization, has the responsibility of preparing work plans and maps, training, checking on adequacy of work, keeping records and making periodic reports.

### Current Work, 1954

#### Surveys

Surveys, chiefly as post-check, were performed by members of the BRC organization on Indian lands of the Leech Lake, White Earth, Red Lake, Lac Court Oreilles, Lac du Flambeau, and Menominee Reservations. Aside from a reduction of 163 acres of white pine and 228 acres of control area on the Leech Lake Reservation, no change in the total control problem was made in 1954. Application of post-check survey data to the status of control is shown in Text Table 6.

#### Local Control

Ribes eradication in 1954 was done on 30 areas on 6 of the 11 reservations (Text Table 5). Protection was given 4,530 acres of white pine by removing 223,934 ribes from 6,695 acres of control area at a cost of 2,147 man-days. Less acreage was covered but more ribes were pulled, using about 700 less man-days than in 1953. About one-seventh of the acreage covered was initial work, and the remainder was rework of areas previously covered 5 to 7 years ago. As in the past, Indian labor and field supervision was used exclusively. On the Menominee Reservation women performed ribes eradication for the twelfth consecutive season. Five crews, each consisting of 4 women laborers and a woman crew leader, were employed from May 3 to June 30. Indian men were used on all of the other reservations.





All of the work on the Menominee, Leech Lake, Nett Lake and most of it on the Red Lake, Lac du Flambeau and Lac Court Oreilles Reservations was done prior to July 1. Since ribes are among the first bushes to leaf out, May and June is the optimum time for their eradication.

Because ribes were generally scattered on most of the areas worked, chemical eradication was not practical, and ribes destruction was principally done by hand pulling. Concentrations of ribes were killed by use of 2,4,5-T. in oil or in water on the Leech Lake and Menominee Reservations. Good work was done in 1954. All of the 6,695 acres worked checked as satisfactory.

### Status of Control

In Text Table 6 the status of control by Reservations at the end of 1954 is shown. For all 11 Reservations control work is on schedule, with 98.0% of the 138,100 acres of control initially worked, and 77.5% of it on maintenance. All of the control areas on the Vermilion and Lac du Flambeau Reservations have been initially worked and are on maintenance. Control areas on the Sac Fox, Grand Portage, Nett Lake and Red Lake Reservations have been initially worked, but require rework. Most of the initial work and over half of the rework remaining is on the Menominee Reservation.

Through eradication work and post-check, an additional 8,242 acres of control area on the Lac Court Oreilles, Lac du Flambeau, and Menominee Reservations were placed on maintenance in 1954.

### Costs, 1954

As shown in Text Table 7, \$21,505.22 of Indian Service funds and \$3,396.95 of Menominee Tribal funds for a total of \$24,902.17, all used on ribes eradication, was spent in calendar year 1954. Approximately four-fifths were spent in May and June.

Costs per acre worked varied from \$2.86 on the Great Lakes Agency to \$6.35 on the Consolidated Chippewa. Costs varied with ribes abundance. On the Great Lakes Agency lands ribes occurred at an average of 21½ bushes per acre, while on the Consolidated Chippewa they averaged 260 per acre. Ribes in general are more abundant on Indian lands than on those of other ownerships.

The cost per man-day varied from \$7.52 on the Consolidated Chippewa Agency, to \$12.99 on the Great Lakes. The low cost of \$7.52 was made up of wages to laborers and a crew leader only. There were no travel costs, or salary of a supervisor involved. These costs were present on the other Reservations.

### Work Plans

In 1943 a long-time work plan was prepared for each Reservation with the objective of establishing and maintaining control around all valuable white pine stands. This was revised in 1949, based on an increase of white pine from 50,262 acres in 1943 to 72,296 acres in 1949 due to





natural white pine reproduction. Since then more natural white pine has come in, so that at the end of 1954 there are 81,869 acres of white pine listed for protection. While in general the long-time work plans have been followed, it is necessary because of increased pine acreage to increase the funds needed for F.Y. 1956 from \$24,600 as given in the long-time plan, to \$29,600 (shown in Text Table 8). This figure is made up of \$25,200 of Gratuity funds, and \$4,400 of Menominee Tribal funds. Higher wage rates since 1949 are also responsible for increasing the funds needed in F.Y. 1956.

### Status of Control by Reservations

A resume of the status of control on each Reservation follows:

#### Sas Fox Reservation, Iowa

No work has been done since 1952. There are 50 acres of fast-growing planted pine which were worked initially in 1935, and reworked in 1951 and 1952. About half of it is on maintenance. Another working in 1957 should put the rest of the pine on maintenance.

#### Grand Portage Reservation, Minnesota

There is no change in status since 1953. All of the 1,097 acres of white pine has been initially worked, and parts of it reworked. Owing to abundance of ribes and heavy rust in this locality, no acreage has been placed on maintenance.

#### Leech Lake, Minnesota

One area of 150 acres was reworked in 1954. As a result of adjustments in ownership, there was a reduction in the control problem of 163 acres of white pine and 228 acres of control area. At year's end 97.4% of the control area had been initially worked and 65.5% was on maintenance.

It is planned to use \$400 of the \$2,800 of F.Y. 1955 funds in working 108 acres (all rework) using 40 man-days in May and June, 1955. No work is planned for F.Y. 1956.

#### Nett Lake, Minnesota

One area and part of another totalling 49 acres were reworked in 1954. The status of control at year's end was not changed. All of the 7,079 acres of control area have been initially worked, and 88.1% is now on maintenance.

No funds are available for work in the spring of 1955. The budget for F.Y. 1956, \$1,000, is planned for rework of 840 acres using 100 man-days in May and June, 1956.

#### Vermilion, Minnesota

No work was done in 1954. The 78 acres of white pine with 186 acres of control area are on maintenance. No future work is planned other than an examination in later years to make sure ribes remain suppressed, or if new areas of white pine develop.





### White Earth, Minnesota

Some post-check work was done in 1954. The status of control remains the same with all of the 1,056 acres in the control area initially worked, and 51.6% of it on maintenance.

Local control on 511 acres of rework, using 250 man-days, is scheduled in May and June, 1955, on \$2,400 of the \$2,800 available. No work is planned for F.Y. 1956.

### Red Lake, Minnesota

Post-check was done as part of the eradication work in 1954. There were 1,478 acres reworked, using 559 man-days. Peak employment was in May and June with 21 Indians working. From July 1 to September 8 a crew of 5 men worked. Checking after eradication showed that all work done was satisfactory.

All of the 19,143 acres of control area have been initially worked, and 77.3% is on maintenance.

In accordance with long-time program, it is planned to post-check and rework 3,737 acres using 400 man-days on the balance of \$4,545 of F.Y. 1955 funds during May and June. For the F.Y. 1956 a budget of \$8,800 is recommended for rework of \$5,500 acres using 800 man-days.

### Bad River, Wisconsin

No work has been done recently on this Reservation. At year's end, of the 15,023 acres of control area, 98.8%, or all but 177 acres, has been initially worked, and 90.0% is on maintenance.

No funds have been set up in the budget for May and June, 1955 or for F.Y. 1956.

### Lac Court Oreilles, Wisconsin

One area of initial, and 9 areas of rework, totalling 2,309 acres, were satisfactorily worked in 1954. Experienced Indian labor and field supervisors were used.

At year's end 98.9% of the 25,485 acres in the control problem had been initially worked, and 84.1% of it had been placed on maintenance. Through eradication and post-check, 4,800 additional acres of control area were placed on maintenance in 1954.

During the remainder of F.Y. 1955 it is planned to use the balance of available funds, \$5,000, in working 3,500 acres using 450 man-days. The budget for F.Y. 1956 calls for working 4,000 acres using 850 man-days, and costing \$11,000.





### Lac du Flambeau, Wisconsin

During 1954 ribes eradication, all rework was done satisfactorily on 1,089 acres.

As a result of post-check and ribes eradication in 1954, 1,597 acres of rework were placed on maintenance. At year's end all of the 26,001 acres of control area had been initially worked and placed on maintenance. This Reservation joins the Vermilion in having all of the known good white pine areas on maintenance.

No further work on the Lac du Flambeau is planned for the next few years.

### Menominee, Wisconsin

Control operations in 1954 were essentially on the same basis as in previous years. Work started on May 3 and terminated on June 30. Spring is the most favorable time for ribes eradication. For the twelfth consecutive season Indian women made up the eradication crews. Five crews were employed each crew composed of 4 women in line with a woman crew leader. The group was in charge of a male Indian foreman.

There were 6 areas worked, 4 of which were initial and 2 rework. A total of 1,620 acres were satisfactorily cleared of ribes, using 672 man-days.

The total control problem of 24,100 acres of white pine in 40,492 acres of control area was the same as at the end of 1953. At year's end 94.4% of the control area had been initially worked, and 57.0% of it was on maintenance. During 1954, 920 additional acres of control area had been initially worked, and 1,840 acres placed on maintenance.

Funds for control work on the Menominee are half gratuity and half Tribal funds. For the remainder of F.Y. 1955 approximately \$7,000 from these two sources are available. It is expected that 1,440 acres will be worked, using 700 man-days.

In November, 1954, a revised 5-year control program was prepared. The F.Y. 1956 part of this plan is based on \$8,800, half of which is from the Menominee Tribe. Plans include working 2,460 acres, using 880 man-days.





Text Table 5. Local Control on Indian Reservations,

North Central Region, Calendar Year 1954

Indian Reservation	Number of Areas Worked	Acres of White Pine Protected	Acres of Control Area Worked	Ribes Bushes Destroyed	Man-Days Used
<u>Initial Work</u>					
Lac Court Oreilles, Wis.	1	51	73	1,303	6
Menominee, Wis.	4	520	860	45,646	482
Total, Initial	5	571	933	46,949	488
<u>Rework</u>					
Nett Lake, Minn.	2	34	49	20,927	67
Leech Lake, Minn.	1	65	150	30,836	101
Red Lake, Minn.	9	1,294	1,478	44,334	559
Lac Court Oreilles, Wis.	9	1,239	2,236	55,516	529
Lac du Flambeau, Wis.	2	807	1,089	16,042	213
Menominee, Wis.	2	520	760	9,330	190
Total, Rework	25	3,959	5,762	176,985	1,659
<u>All Work</u>					
Nett Lake, Minn.	2	34	49	20,927	67
Leech Lake, Minn.	1	65	150	30,836	101
Red Lake, Minn.	9	1,294	1,478	44,334	559
Lac Court Oreilles, Wis.	10	1,290	2,307	56,819	535
Lac du Flambeau, Wis.	2	807	1,089	16,042	213
Menominee, Wis.	6	1,040	1,620	54,976	672
Total, All Work	30	4,530	6,695	223,934	2,147





Text Table 6. Status of Control on Indian Reservations, North Central Region, on December 31, 1954

Indian Reservation	Total Acres		Acres Initially Worked		Percent Control Area Initially Worked		Acres Control Area Required	
	White	Pine	White	Pine	Initially	On	Initial	Maintenance
	Area	Area	Area	Area	Worked	Maintenance	Work	Work
Sac Fox, Iowa	50	500	50	500	100.0	41.2	-	294
Grand Portage, Minn.	1,097	1,496	1,097	1,496	100.0	0.0	-	1,496
Leech Lake, Minn.	1,094	1,639	1,080	1,596	97.4	65.5	43	523
Nett Lake, Minn.	5,212	7,079	5,212	7,079	100.0	88.1	-	841
Vermilion, Minn.	78	186	78	186	100.0	100.0	-	-
White Earth, Minn.	502	1,056	502	1,056	100.0	51.6	-	511
Red Lake, Minn.	12,604	19,143	12,604	19,143	100.0	77.3	-	4,354
Bad River, Wis.	8,547	15,023	8,451	14,846	98.8	90.0	177	1,327
Lac Court Oreilles, Wis.	14,174	25,485	14,025	25,208	98.9	84.1	277	3,786
Lac du Flambeau, Wis.	14,411	26,001	14,411	26,001	100.0	100.0	-	-
Menominee, Wis.	24,100	40,492	22,917	38,207	94.4	57.0	2,285	15,112
Totals	81,869	138,100	80,427	135,318	98.0	77.5	2,782	28,244
								107,076

Text Table 7. Indian Service and Menominee Tribal Funds Spent on Blister Rust Control, North Central Region, Calendar Year 1954. (All spent on Ribes Eradication).

Indian Agency	Costs, Calendar Year 1954		Ribes Eradication, 1954		Av. Cost Per:	
	January-June	July-December	Year 1954	Man-Days	Acres Worked	Man-Day
				Used		
Consolidated Chippewa, Minn.	\$ 1,262.74	-	\$ 1,262.74	168	\$6.35	\$7.52
Red Lake, Minn.	4,750.00	\$ 2,375.00	7,125.00	559	4.82	12.75
Great Lakes, Wis.	6,993.09	2,724.39	9,717.48	748	2.86	12.99
Menominee Wis. (U.S.F.S.)	3,400.00	-	3,400.00			
Menominee Tribal Funds	3,396.95	-	3,396.95	672	4.20	10.11
Totals	\$19,802.78	\$ 5,099.39	\$24,902.17	2,147	3.72	11.60



Text Table 8. Work Plans for Indian Reservations,  
North Central Region, January to June, 1955,  
and Fiscal Year 1956.

	January to June, 1955			Fiscal Year 1956		
	Acres to be Worked	Man- Days Needed	Estimated Costs (Field Work Only)	Acres to be Worked	Man- Days Needed	Estimated Costs (Field Work Only)
Consolidated Chippewa White Earth and Leech Lake	628	290	\$ 2,800	-	-	-
Nett Lake	-	-	-	840	100	\$ 1,000
Red Lake Agency	3,737	400	4,545	5,500	800	8,800
Great Lakes Agency Lac Court Oreilles Res.	3,500	450	5,000	4,000	850	11,000
Menominee Agency	1,440	700	7,000 *	2,460	880	8,800
Total.	9,305	1,840	\$ 19,345	12,800	2,630	\$ 29,600

\* Half Gratuity, hal Menominee Tribal Funds





Chart 4. Status of Control on Indian Reservations, R-9, on December 31, 1954.

Acres in Control Area

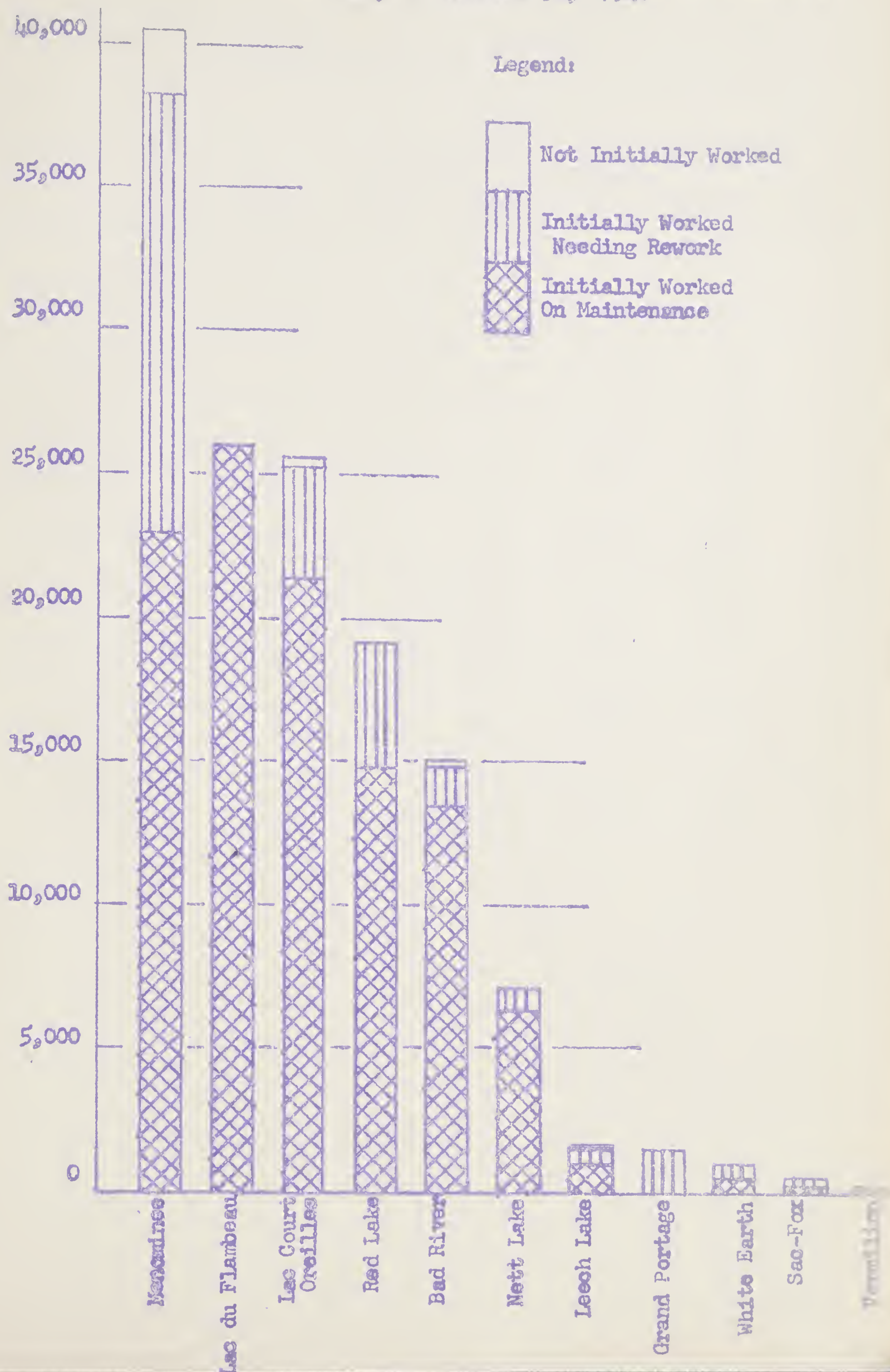






Table 1. Surveys Performed in North Central Region,  
Calendar Year, 1954

State	Type of Survey	No. of Areas Mapped	Acres Mapped Previously		Total Acres Mapped, Net		Man-Days Used
			White Pine	Control Area	White Pine	Control Area	
Illinois	Pre-eradication	15	-	-	191	1,299	15
	Post-Check	1	8	116	8	72	1
	Total	16	8	116	199	1,371	16
Iowa	Pre-eradication	1	15	35	10	32	3
	Post-Check	4	72	606	72	606	5
	Total	5	87	641	82	638	8
Ohio	Pre-eradication	34	-	-	466	1,311	14
	Post-Check	31	1,401	9,579	1,348	3,329	20
	Total	65	1,401	9,579	1,814	4,640	34
Michigan	Pre-eradication	106	-	-	11,375	24,037	98
	Post-Check	105	10,238	28,519	13,823	25,819	108
	Total	211	10,238	28,519	25,198	49,856	206
Minnesota	Pre-eradication	52	1,055	2,261	3,357	5,700	145
	Post-Check	93	8,502	14,444	9,207	14,096	197
	Total	145	9,557	16,705	12,564	19,796	342
Wisconsin	Pre-eradication	80	-	-	17,525	42,765	159
	Post-Check	46	7,468	17,069	8,847	16,809	103
	Total	126	7,468	17,069	26,372	59,574	262
Region	Pre-eradication	288	1,070	2,296	32,924	75,144	434
	Post-Check	280	27,689	70,363	33,305	60,731	434
	Total	568	28,759	72,659	66,229	135,875	868





Table 2. Summary of Local Control by States and Ownership Classes  
North Central Region, Calendar Year 1954.

State	Ownership Class	Number Acres Worked	Acres White Pine Protected	Acres Worked	Ribes Destroyed	Man-Day
<u>Initial Working</u>						
Illinois	Private	11	92	799	21,758	30
Ohio	Private	29	287	879	702	9
	Non-Fed. Public	3	108	207	1,651	14
	Total	32	395	1,086	2,353	23
Michigan	Private	23	1,538	3,475	19,262	255
	Non-Fed. Public	16	2,880	5,007	73,256	570
	Nat. Forests	21	2,409	4,500	61,094	281
	Total	60	6,827	12,982	153,612	1,106
Minnesota	Private	1	73	140	3,296	42
	Non-Fed. Public	6	259	817	35,548	150
	Nat. Forests	22	990	1,591	91,748	824
	Total	29	1,322	2,548	130,592	1,016
Wisconsin	Private	14	8,035	25,068	94,923	658
	Non-Fed. Public	18	1,323	3,968	134,397	997
	Nat. Forests	9	2,618	3,416	131,937	1,104
	Ind. Reserv.	5	571	933	46,949	488
	Total	46	12,547	33,385	408,206	3,247
Region	Private	78	10,025	30,361	139,941	994
	Non-Fed. Public	43	4,570	9,999	244,852	1,731
	Nat. Forests	52	6,017	9,507	284,779	2,209
	Ind. Reserv.	5	571	933	46,949	488
	Total	178	21,183	50,800	716,521	5,422

<u>Re-Work</u>						
Illinois	Private	2	55	207	10,212	19
Iowa	Private	1	-	4	253	2
	Non-Fed. Public	2	255	711	12,226	283
	Total	3	255	715	12,479	285
Ohio	Private	21	1,330	3,299	1,110	19
Michigan	Private	35	2,942	6,767	124,726	1,184
	Non-Fed. Public	11	922	1,881	31,206	266
	Nat. Forests	40	7,545	14,589	71,607	934
	Total	86	11,409	23,237	227,539	2,334
Minnesota	Private	5	90	398	6,511	43
	Non-Fed. Public	10	770	976	96,569	711
	Nat. Forests	34	3,865	4,832	146,504	1,898
	Ind. Reserv.	12	1,393	1,677	96,097	727
	Total	61	6,118	7,883	345,681	3,379
Wisconsin	Private	5	639	1,319	21,143	175
	Non-Fed. Public	5	443	946	40,851	566
	Nat. Forests	6	1,578	2,850	31,512	352
	Ind. Reserv.	13	2,566	4,085	80,888	932
	Total	29	5,226	9,200	174,394	2,025
Region	Private	69	5,056	11,994	163,955	1,442
	Non-Fed. Public	28	2,390	4,514	180,852	1,826
	Nat. Forests	80	12,988	22,271	249,623	3,184
	Ind. Reserv.	25	3,959	5,762	176,985	1,659
	Total	202	24,393	44,541	771,415	8,111





Table 2. (Cont'd.) Summary of Local Control by States and Operating Classes, North Central Region, Calendar Year 1954.

State	Ownership Class	Number Areas Worked	Acre White Pine Protected	Acre Worked	Ribes Destroyed	Man-Days
<u>All Work</u>						
Illinois	Private	13	147	1,006	31,970	49
Iowa	Private	1	-	4	253	2
	Non-Fed. Public	2	255	711	12,226	281
	Total	3	255	715	12,479	283
Ohio	Private	50	1,617	4,178	1,812	28
	Non-Fed. Public	3	108	207	1,651	11
	Total	53	1,725	4,385	3,463	42
Michigan	Private	58	4,480	10,242	143,988	1,439
	Non-Fed. Public	27	3,802	6,888	104,462	825
	Nat. Forests	61	9,954	19,089	132,701	1,215
	Total	146	18,236	36,219	381,151	3,479
Minnesota	Private	6	163	538	9,807	85
	Non-Fed. Public	16	1,029	1,793	132,117	861
	Nat. Forests	56	4,855	6,423	238,252	2,722
	Ind. Reserv.	12	1,393	1,677	96,097	727
	Total	90	7,440	10,431	476,273	4,395
Wisconsin	Private	19	8,674	26,387	116,066	833
	Non-Fed. Public	23	1,766	4,914	175,248	1,563
	Nat. Forests	15	4,196	6,266	163,449	1,455
	Ind. Reserv.	18	3,137	5,018	127,837	1,420
	Total	75	17,773	42,585	582,600	5,272
Region	Private	147	15,081	42,355	303,896	2,436
	Non-Fed. Public	71	6,960	14,513	425,704	3,557
	Nat. Forests	132	19,005	31,778	534,402	5,393
	Ind. Reserv.	30	4,530	6,695	223,934	2,147
	Total	380	45,576	95,341	1,487,936	13,533





Table 3. Results of Checking After Ribes Eradication by States and Ownership Classes, North Central Region, Calendar Year 1954.

State	Ownership Class	Number of Acres	Acres Worked and Checked	Strip Acres	Acres Worked Classified on Basis of Ribes F.L.S. per Acre Left After Working 0-15, F.L.S. 15.1-25 F.L.S. Over 25 F.L.S.	
Iowa	State-Private	1	696	8.00	696	
Ohio	State-Private	51	4,347	76.20	4,322	25
Michigan	State-Private	56	11,952	205.60	11,513	379
	Nat. Forests	61	16,864	251.10	16,679	185
	Total	117	28,816	456.70	28,192	564
Minnesota	State-Private	13	1,430	58.62	1,193	237
	Nat. Forests	53	6,263	152.72	6,156	42
	Ind. Reserv.	10	1,232	55.98	1,082	150
	Total	76	8,925	267.32	8,431	429
Wisconsin	State-Private	40	31,341	663.4	31,341	-
	Nat. Forests	14	6,266	152.7	6,266	-
	Ind. Reserv.	17	4,806	72.7	4,806	-
	Total	71	42,413	888.8	42,413	-
Region	State-Private	161	49,766	1,011.82	49,065	641
	Nat. Forests	128	29,393	556.52	29,101	227
	Ind. Reserv.	27	6,038	128.68	5,888	150
	Total	316	85,197	1,697.02	84,054	1,018





Table 4. Status of Control by States and Districts, North Central Region,  
on December 31, 1954 - Net Acres

District	Total Acres		Acres Initially Worked		Percent Control Area		Acres Control Area Requiring		Maintenance Work
	White Pine	Control Area	White Pine	Control Area	Initially Worked	On Maintenance	Initial Work	Rework	
AREA I									
Iowa									
Entire State	3,124	14,729	1,853	10,778	73.2	16.7	3,951	8,318	2,460
Minnesota									
Duluth	104,111	275,992	65,120	151,917	55.0	13.7	124,075	114,106	37,811
Walker	122,915	244,564	102,080	220,911	90.3	35.0	23,653	135,387	85,524
Entire State	227,026	520,556	167,200	372,828	71.6	23.7	147,728	249,493	123,335
Total Area I	230,150	535,285	169,053	383,606	71.7	23.5	151,679	257,811	125,795
AREA II									
Illinois									
Entire State	2,352	12,651	2,285	12,125	95.8	17.1	526	9,956	2,169
Wisconsin									
Eastern	209,198	686,979	187,825	605,601	88.2	44.4	81,378	300,510	305,091
Western	320,655	934,271	284,823	793,611	84.9	47.4	140,660	351,222	442,389
Entire State	529,853	1,621,250	472,648	1,399,212	86.3	46.1	222,038	651,732	717,480
Total Area II	532,205	1,633,901	474,933	1,411,317	85.1	45.9	222,564	661,688	719,649
AREA III									
Indiana									
Entire State	10,747	92,584	9,221	79,484	85.9	72.3	13,100	12,569	66,915
Ohio									
Entire State	22,490	186,414	18,389	161,161	86.5	54.9	25,253	58,751	102,410
Michigan									
Lower Penin.	291,409	908,399	263,980	811,531	89.3	42.7	96,868	423,896	387,635
Upper Penin.	145,245	330,120	127,989	292,717	88.7	53.5	37,403	116,170	176,547
Entire State	436,654	1,238,519	391,969	1,104,248	89.2	45.6	134,271	540,066	564,182
Total Area III	459,791	1,517,517	419,579	1,344,893	88.6	48.3	172,624	611,386	733,507
Region Total	1,222,245	3,486,701	1,063,565	3,139,836	85.2	43.6	546,867	1,570,835	1,608,951





Table 5. Status of Control by Ownership Classes, North Central Region,  
on December 31, 1954 - Net Acres

Forest or State	Total Acres		Acres Initially Worked		Percent Control Area		Acres Control Area Requiring		
	White Pine	Control Area	White Pine	Control Area	Initially Worked	On Maintenance	Initial		Re-Work
							Work	Maintenance	
Private									
Illinois	888	5,260	823	4,832	91.9	11.1	428	4,248	584
Indiana	7,560	74,196	6,146	61,983	83.5	68.8	12,213	10,970	51,013
Iowa	2,485	10,551	1,215	6,664	63.2	19.5	3,887	4,609	2,055
Ohio	14,106	140,051	11,390	118,980	85.0	57.0	21,071	39,087	79,893
Michigan	222,911	728,857	194,506	633,211	86.9	34.6	95,646	381,022	252,189
Minnesota	109,436	315,432	76,241	222,275	70.5	15.2	93,157	174,279	47,996
Wisconsin	279,300	1,028,629	226,977	815,151	79.2	41.1	213,478	392,513	422,638
Total, Private	636,686	2,302,976	517,295	1,863,096	80.9	37.2	439,080	1,006,720	856,368
State, County, Municipal									
Illinois	1,464	7,391	1,462	7,293	98.7	21.4	98	5,708	1,585
Indiana	3,169	18,209	3,057	17,322	95.1	86.3	887	1,599	15,723
Iowa	589	3,678	588	3,614	98.3	5.4	64	3,415	199
Ohio	7,869	42,334	6,484	38,152	90.1	43.7	4,182	19,664	18,488
Michigan	139,954	323,633	128,562	296,243	91.5	51.9	27,390	128,139	168,104
Minnesota	53,034	109,591	33,087	65,606	59.9	18.4	43,985	45,419	20,187
Wisconsin	148,336	414,076	146,585	411,710	99.4	46.3	2,366	219,986	191,724
Total, Non-Pub.	354,415	910,912	319,825	839,940	91.4	45.3	78,972	423,930	446,010





Table 5. (Cont'd.) Status of Control by Ownership Classes. North Central Region,  
on December 31, 1954 - Net Acres.

Forest or State	Total Acres		Acres Initially Worked		Percent Control Area Initially Worked		Acres Control Area Requiring	
	White Pine	Control Area	White Pine	Control Area	Initially Worked	On Maintenance	Initial Work	Re-Work Maintenance Work
National Forests								
Hoosier, Ind.	18	179	18	179	100.0%	100.0%	-	179
Wayne, Ohio	515	4,029	515	4,029	100.0	100.0	-	4,029
Huron, Mich.	7,762	17,419	5,759	13,034	74.8	43.5	4,385	5,455
Manistee, Mich.	28,685	83,483	27,285	80,203	96.1	92.9	3,280	2,619
Hiawatha, Mich.	14,537	38,371	13,182	35,221	91.8	67.5	3,150	9,325
Marquette, Mich.	11,702	25,720	11,702	25,720	100.0	81.4	-	4,778
Ottawa, Mich.	11,103	21,036	10,973	20,616	98.0	56.5	420	8,728
Superior, Minn.	31,808	44,316	25,337	34,115	77.0	37.9	10,201	17,298
Chippewa, Minn.	12,161	20,618	11,962	20,276	98.3	75.2	342	4,772
Chequamegon, Wis.	27,967	46,053	26,379	42,968	93.3	71.1	3,085	10,220
Nicolet, Wis.	13,018	25,491	12,903	25,121	98.5	64.1	370	8,788
Total, National Forests	159,276	326,715	146,015	301,482	92.3	70.2	25,233	71,983
Indian Reservations								
Sac Fox, Iowa	50	500	50	500	100.0	41.2	-	294
Grand Portage, Minn.	1,097	1,496	1,097	1,496	100.0	0.0	-	1,496
Leech Lake, Minn.	1,094	1,639	1,080	1,596	97.4	65.5	43	523
Nett Lake, Minn.	5,212	7,079	5,212	7,079	100.0	88.1	-	841
Vermilion, Minn.	78	186	78	186	100.0	100.0	-	-
White Earth, Minn.	502	1,056	502	1,056	100.0	51.6	-	511
Red Lake, Minn.	12,604	19,143	12,604	19,143	100.0	77.3	-	4,354
Sac River, Wis.	8,547	15,023	8,451	14,846	98.8	90.0	177	1,327
Lac Court Oreilles, Wis.	14,174	25,485	14,025	25,208	98.9	84.1	277	3,786
Lac du Flambeau, Wis.	14,411	26,001	14,411	26,001	100.0	100.0	-	-
Menominee, Wis.	24,100	40,422	22,217	38,207	94.4	57.0	2,285	15,112
Total, Ind. Reservations	81,869	138,100	80,427	135,318	98.0	77.5	2,782	28,214
Grand Total,	241,145	464,815	226,442	436,799	93.7	73.6	28,015	100,197
All Ownership	241,145	464,815	226,442	436,799	93.7	73.6	28,015	100,197





Table 6. Current and Cumulative Canker Pruning, North Central Region. From Inception to December 31, 1954.

State	Number of Areas Treated	Number of Trees Examined	Number of Trees Removed	Number of Trees Treated	Number of Cankers Removed	Man-Days Used
<u>Calendar Year 1954</u>						
Iowa	6	4,900	14	25	32	4
Minnesota	5	1,211	47	332	992	26
Wisconsin	7	42,100	595	8,253	9,803	52
Totals	18	48,211	656	8,610	10,827	82
<u>Cumulative to December 31, 1954</u>						
Indiana	4	973	0	8	11	1
Iowa	82	65,292	922	1,009	2,330	76
Ohio	5	1,306	13	44	126	15
Michigan	366	825,356	520	56,071	112,646	3,713
Minnesota	193	528,125	6,611	49,882	85,544	2,301
Wisconsin	22	451,465	5,949	34,584	45,493	625
Totals	672	1,872,517	14,015	141,598	246,150	6,731

Table 7. Nursery Sanitation Performed North Central Region, 1954  
(All in Wisconsin)

Ownership and Name of Nursery	Working	White Pine Trees in Nursery	Acres Protect- ed	Acres in Sanita- tion Zone	Ribes Destroy- ed	Man- Days Used
Boscobel, State	Second	2,225,000	130	600	695	12
Gordon, State	Eleventh	563,000	20	373	265	43
Hayward, State	Eleventh	1,601,000	80	552	314	34
Nepco-5 Mile (Private)	Third	1,000,000	30	127	3,665	53
Totals		5,389,000	260	1,652	4,939	142





**Table 8. Approximate Number of Man-Months Employed by Months and Agencies, North Central Region, Calendar Year 1954**

Agency	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total	Average Per Month
Illinois														
State and Private	1.0	1.0	1.0	2.0	1.7	1.0	1.0	1.0	1.1	2.0	1.0	1.0	11.8	1.0
State and Private	-	0.1	0.1	0.1	0.1	0.1	-	-	-	-	-	-	0.5	Tr
F.S.-712	-	-	-	-	-	-	-	-	-	1.0	1.0	-	2.0	0.2
Total	-	0.1	0.1	0.1	0.1	0.1	-	-	-	1.0	1.0	-	2.5	0.2
Indiana														
State and Private	-	-	-	-	-	5.2	3.9	1.0	-	-	-	-	10.1	0.6
F.S.-712	-	-	-	-	-	-	-	-	-	-	-	0.5	0.5	Tr
F.S.-432	1.0	1.0	1.0	1.0	-	2.0	1.1	1.0	-	-	-	1.0	9.1	0.8
Total	1.0	1.0	1.0	1.0	-	7.2	5.0	2.0	-	-	-	1.5	19.7	1.6
Ohio														
State and Private	0.1	0.1	0.2	0.3	0.3	0.7	0.3	0.5	0.2	0.1	0.1	0.1	3.0	0.3
F.S.-712	-	-	-	-	-	-	-	-	-	-	-	1.0	1.0	0.1
F.S.-432	1.0	1.0	1.0	1.0	1.0	1.0	-	-	-	-	-	-	6.0	0.5
Total	1.1	1.1	1.2	1.3	1.3	1.7	0.3	0.5	0.2	0.1	0.1	1.1	10.0	0.9
Michigan														
State and Private	2.0	2.0	2.0	2.0	11.0	35.0	29.0	23.8	12.5	3.5	2.0	2.0	126.8	10.6
F.S.-712	1.0	1.0	1.5	2.0	2.0	2.0	3.0	2.0	3.0	2.2	2.0	1.6	23.3	1.9
F.S.-432	1.0	1.0	0.5	-	1.4	4.0	4.0	5.0	2.8	-	-	-	19.7	1.7
National Forests	-	-	-	-	5.7	15.5	16.1	14.3	2.9	-	-	-	54.5	4.5
Total	4.0	4.0	4.0	4.0	20.1	56.5	52.1	45.1	21.2	5.7	4.0	3.6	224.3	18.7











Table 9. North Central Regional Expenditures, by States and Sources, Calendar Year 1954

Appropriation	Illinois	Indiana	Iowa	Ohio	Michigan	Minnesota	Wisconsin	Project Office	Total
State Indirect Aid									
January-June	\$ 280.00	\$ 375.00	\$ 460.00	\$ 432.00	\$ 675.00	\$ 1,350.00	\$ 6,900.00	-	\$ 10,472.00
July-December	210.00	375.00	460.00	432.00	675.00	1,750.00	8,100.00	-	12,002.00
State Direct Aid									
January-June	4,403.82	100.00	961.61	355.00	13,803.34	3,518.70	16,984.82	-	40,127.29
July-December	3,358.32	100.00	880.00	485.00	18,745.82	5,768.81	20,037.67	-	49,375.63
Sub-total, State	8,252.14	950.00	2,761.61	1,704.00	33,899.16	12,387.51	52,022.49		111,976.91
For. Service 712									
January-June	-	-	-	854.07	6,538.70	9,871.61	10,363.58	17,333.64 (a)	44,961.50
July-December	320.95	717.60	233.96	353.55	7,433.69	8,721.75	9,422.46	11,812.30 (b)	39,016.21
For. Service 432									
January-June	-	-	3,182.33	3,066.66	5,970.45	5,231.70	6,913.38	-	24,361.52
July-December	-	-	1,293.70	447.00	4,411.60	2,817.54	3,439.63	-	12,409.47
National Forests									
January-June	-	-	-	-	5,557.88	23,281.08	7,455.80	-	36,294.76
July-December	-	-	-	-	9,171.41	35,055.37	11,203.18	-	55,429.96
Indian Service									
January-June	-	-	-	-	6,012.74	10,393.09	16,405.80	-	32,801.63
July-December	-	-	-	-	2,375.00	2,724.39	5,099.00	-	10,199.39
Sub-total, Fed.	320.95	717.60	4,709.99	4,721.28	39,083.73	93,366.79	61,915.51	29,145.94	233,981.77
ALL FUNDS									
January-June	4,683.82	475.00	4,603.94	4,707.73	32,545.37	49,265.83	59,010.67	17,333.64	132,626.00
July-December	3,889.27	1,192.60	2,867.66	1,717.55	40,437.52	56,488.47	54,927.33	11,812.30	123,332.03
Grand Total	8,573.09	1,667.60	7,471.60	6,425.28	72,982.89	105,754.30	113,938.00	29,145.94	345,958.77

(a) Includes \$2,593.20 of Common Services

(b) Includes 2,602.50 of Common Services





Table 9 A. North Central Region Expenditures, by State and Activity, Calendar Year 1954

State	Program					Percent		
	Planning Direction	Surveys, Checking	Ribes Eradication	Nursery Protection	Canker Pruning	Methods Studies	Educational Work	Each State
Illinois	\$ 1,596.59	\$ 950.00	\$ 1,226.50	=	=	\$ 2,150.00	\$ 2,650.00	2.5%
Indiana	1,027.60	100.00	=	240.00	=	=	300.00	0.5
Iowa	853.96	1,092.33	4,165.31	300.00	65.00	465.00	530.00	2.2
Ohio	1,068.00	2,994.00	1,074.28	504.00	=	=	785.00	1.9
Michigan	9,621.64	7,971.72	54,714.53	=	=	=	675.00	21.1
Minnesota	11,092.49	10,870.33	78,435.76	400.00	363.08	2,657.82	1,934.82	30.5
Wisconsin	8,179.00	4,121.97	83,352.41	1,642.50	612.12	13,650.00	2,380.00	32.9
Project Office	24,145.94	=	=	=	=	4,000.00	1,000.00	8.4
Total	57,535.22	23,100.35	222,963.79	3,036.50	1,040.20	22,922.32	10,254.82	100.0%

Table 9 B. North Central Region Expenditures, by Source of Funds and Activity, Calendar Year 1954

Source of Funds	Program					Percent		
	Planning Direction	Surveys, Checking	Ribes Eradication	Nursery Protection	Canker Pruning	Methods Studies	Educational Work	Each Fund
State Indirect Aid	\$ 7,830.00	=	=	\$ 1,444.00	=	\$ 13,200.00	=	6.5%
State Direct Aid	4,543.09	7,201.26	67,601.13	1,522.50	668.93	3,701.00	4,185.00	25.9
F.S.-712	44,315.07	7,671.20	20,779.49	120.00	200.46	5,476.82	5,414.82	24.3
F.S.-432	518.00	6,497.18	28,573.81	=	65.00	465.00	655.00	10.6
National Forests	379.06	6,730.71	84,509.14	=	105.81	=	=	26.5
Indian Service	=	=	21,505.22	=	=	=	=	6.2
Total	57,535.22	23,100.35	222,963.79	3,036.50	1,040.20	22,922.32	10,254.82	100.0%
Percent Each Activity	16.6%	8.1%	60.5%	0.9%	0.3%	8.6%	3.0%	100.0%

1871-1872

Date	Particulars	Debit	Credit	Balance
Jan 1	Balance forward			100.00
Jan 10	Received from A. B.	50.00		150.00
Jan 20	Received from C. D.	25.00		175.00
Jan 30	Received from E. F.	25.00		200.00
Feb 10	Received from G. H.	50.00		250.00
Feb 20	Received from I. J.	25.00		275.00
Feb 30	Received from K. L.	25.00		300.00
Mar 10	Received from M. N.	50.00		350.00
Mar 20	Received from O. P.	25.00		375.00
Mar 30	Received from Q. R.	25.00		400.00
Apr 10	Received from S. T.	50.00		450.00
Apr 20	Received from U. V.	25.00		475.00
Apr 30	Received from W. X.	25.00		500.00
May 10	Received from Y. Z.	50.00		550.00
May 20	Received from A. B.	25.00		575.00
May 30	Received from C. D.	25.00		600.00
Jun 10	Received from E. F.	50.00		650.00
Jun 20	Received from G. H.	25.00		675.00
Jun 30	Received from I. J.	25.00		700.00
Jul 10	Received from K. L.	50.00		750.00
Jul 20	Received from M. N.	25.00		775.00
Jul 30	Received from O. P.	25.00		800.00
Aug 10	Received from Q. R.	50.00		850.00
Aug 20	Received from S. T.	25.00		875.00
Aug 30	Received from U. V.	25.00		900.00
Sep 10	Received from W. X.	50.00		950.00
Sep 20	Received from Y. Z.	25.00		975.00
Sep 30	Received from A. B.	25.00		1000.00
Oct 10	Received from C. D.	50.00		1050.00
Oct 20	Received from E. F.	25.00		1075.00
Oct 30	Received from G. H.	25.00		1100.00
Nov 10	Received from I. J.	50.00		1150.00
Nov 20	Received from K. L.	25.00		1175.00
Nov 30	Received from M. N.	25.00		1200.00
Dec 10	Received from O. P.	50.00		1250.00
Dec 20	Received from Q. R.	25.00		1275.00
Dec 30	Received from S. T.	25.00		1300.00
Total		1300.00		1300.00

1871-1872

















